



2017 Hurricane and Wildfire Response After-Action Report

U.S. EPA Office of Emergency
Management



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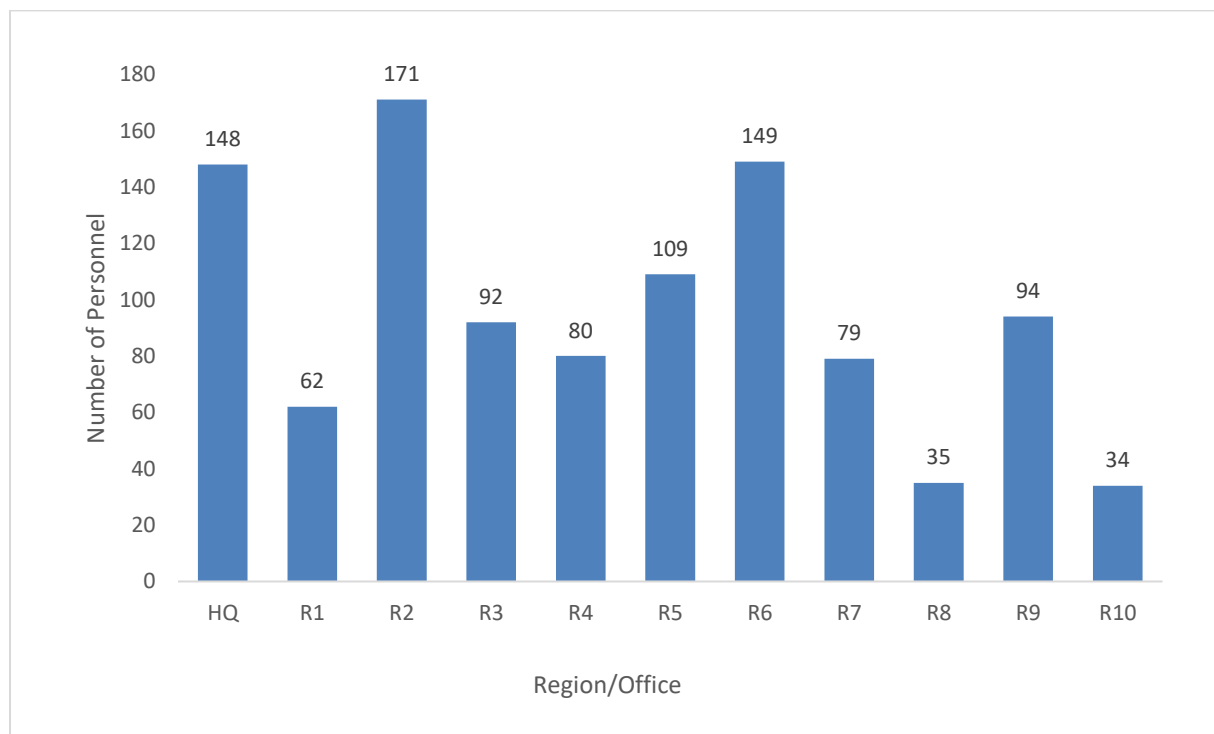
INTRODUCTION

In the fall of 2017, the U.S. Environmental Protection Agency (EPA or the Agency) supported responses to four significant incidents – Hurricane Harvey, Hurricane Irma, Hurricane Maria, and the California Wildfires. These responses were notable because of their collective size, scope, complexity, and overlap in timing. This After-Action Report, prepared by the EPA Office of Emergency Management (OEM), identifies strengths and areas for improvement related to EPA’s response activities. It also includes recommendations to improve the Agency’s response capabilities so it may be better prepared to respond to future incidents.

Overview of EPA Responses

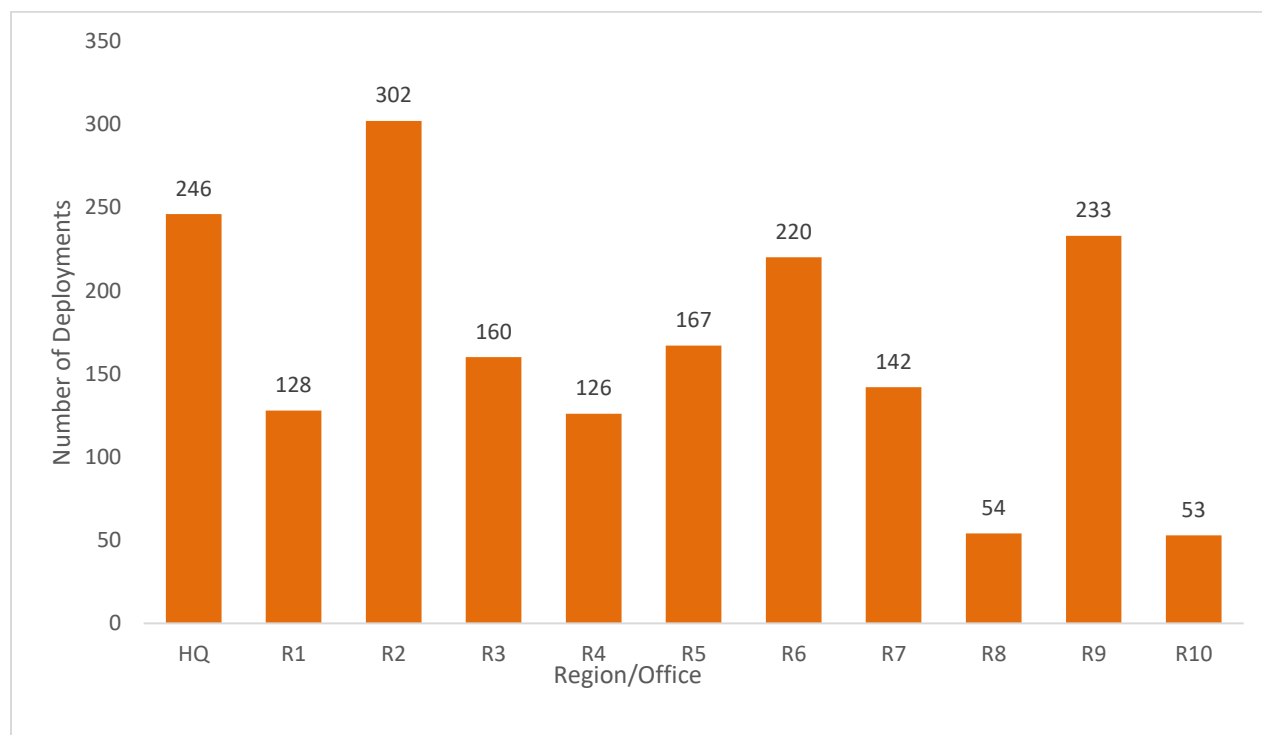
The responses to the 2017 hurricanes and wildfires represented a substantial workload, requiring significant investment of EPA personnel and resources. Across all four incidents, 1,053 EPA personnel were deployed from Headquarters (HQ) and regions (Exhibit 1). There were a total of 1,831 personnel deployments from HQ and regions across all incidents (Exhibit 2), as many individuals were deployed multiple times (Exhibits 1 and 2). As of March 1, 2018, EPA personnel spent a total of 15,347 days deployed to support the four incidents since August 28, 2017.¹

Exhibit 1. Number of EPA Personnel Deployed by HQ and Regions across All Incidents



¹ To analyze deployment data from the Personnel Resource Log (PRL), EPA/OEM developed the 2017 ER Resources Qlik application to facilitate this analysis. Data through March 1, 2018 were reviewed, updated, and made complete to ensure an accurate and complete dataset.

Exhibit 2. Number of EPA Deployments by HQ and Regions across All Incidents



Methodology

This report presents an analysis of strengths and areas for improvement for the following capabilities: planning, public information, logistics, finance, health and safety, operations, and data management. To develop this report, OEM solicited input from EPA response personnel from HQ, the impacted and supporting EPA regions, and the Special Teams through interviews or an online survey tool. It represents an integration of feedback from various sources to provide a broad review of EPA’s emergency response efforts. Recommendations were developed based on identified strengths and areas for improvement, with an emphasis on those that could help improve the overall program or are most likely to address issues the program is likely to face in future responses.

A complete acronym list is provided in Appendix A, and a full list of data sources is provided in Appendix B.

Organization and Handling of this Report

The body of this report presents an analysis of response capabilities organized by Incident Command System functional areas, as they relate to all four incidents. It highlights strengths and areas for improvement, and provides a number of specific recommendations. Incident-specific analyses of capabilities are presented in Appendices C–E. Appendix F presents the full list of overall recommendations as well as incident-specific recommendations.

This document is intended for internal use. For questions regarding this report, please contact Nancy Abrams, EPA/OEM/Resource Management Division, at Abrams.Nancy@epa.gov or (202) 564-8783.

PLANNING

This section presents an analysis of planning capabilities, including management objectives, personnel deployment, regional situation and management reports, intra-agency communication, and documentation, which apply to all four incidents.

Management Objectives

During the interviews, senior managers commented that the management objectives for responses were appropriate and helped guide EPA activities. The management objectives developed by the Policy Coordinating Committee (PCC), with input from the impacted regions, were broad and provided the flexibility to address needs that arose during the response efforts. For example, there was an impacted National Priorities List (NPL) site in Region 9 that was not apparent until the fires were under control, and the objective to assess NPL sites ensured that it was addressed. The objectives were tracked with Emergency Support Function #10 (ESF-10) activities, ESF #3, and responsibilities under EPA's statutory authorities. Feedback indicated that the process of developing management objectives was not driven from "top down," thus allowing opportunities for Removal Managers (RMs) and Senior Regional Managers to provide their input.

Personnel Deployment

Deployment Packages

A majority of responders reported receiving deployment packages that included information such as accounting information, lodging information, equipment/gear requirements, check-in and check-out procedures, People Plus charging information, and demobilization information. Some responders, however, reported that information was missing from their deployment packages (e.g., lists of job responsibilities, and guidance on types of vehicles to rent), or that the deployment packages did not adequately prepare them for their roles in the field.

Cultural Competency

Cultural competence is the ability of individuals and organizations to interact effectively with people of different cultures. Following the 2017–2018 deployments, Region 7 identified the "cultural in-briefings" that occurred prior to deployments as a strength. The briefings were helpful for educating responders about the communities in which they were deployed. Additionally, regional and cultural familiarity should continue to be considered when assigning roles.

Deployment Length

According to PRL, the average length of deployment was two weeks. A majority of the responders reported that their length of activation or deployment was appropriate; however, some responders (particularly in Region 2) felt that two weeks was too short. Region 2 responders also reported that other agencies commented on the length of EPA deployments, as the turnover of EPA staff and lack of consistency was a problem for other agencies. It is important to determine how to balance staffing continuity while maintaining responder morale and stamina during sustained responses.

In Region 2's Hurricane Irma/Maria Response Lessons Learned Work Plan, three-week deployments were ultimately implemented three months after response efforts began. Three-week deployments are preferred as they produce optimal work from the workforce, lessen the burden of personnel changes for the Resource Unit, and provide a more consistent presence on the response. Following all the 2017 responses, Region 7 similarly expressed lengthening the time of deployments and allowing flexibility for rotation length.

In the July 2018 RM meeting, participants recommended starting with two-week deployments and transitioning to three-week deployments for particular positions or as response needs became better known following an incident. Meeting participants were concerned that three-week deployments from the outset might discourage Response Support Corps (RSC) members from volunteering.

Field Transition Mechanisms

Responder feedback across all incidents revealed that a majority of responders utilized mechanisms in the field such as shadowing and receiving informal information from outgoing staff to help with the transition process. However, senior leaders and hot-wash findings suggest EPA needs to focus on staffing continuity for the process. The overlap/transition time for personnel was generally considered too short and further transition guidelines were needed in order to ensure a consistent transfer of knowledge and tasks. Region 3 reported that the lack of a good transition process resulted in miscommunication, redundancy of efforts, and lost time.

Backup Regions and Response Support Corps

Senior leaders from all impacted regions noted that crossover support from backup regions was a major strength of the response. In addition, some regions such as Region 6 commented that they had a strong RSC cadre.

During the February RM face-to-face meeting in Denver, the group suggested conducting a needs assessment for the RSC program to ensure appropriate field readiness and determine where additional depth is needed. In an interview, the Region 9 manager further noted that the RSC cadre needs to be reviewed and expanded to provide additional depth in the non-OSC KLP positions. The Agency needs to actively recruit regional and potentially HQ employees with relevant experience for Key Leadership Position (KLP) support positions.

Regional Situation and Management Reports

In interviews, regional and HQ senior managers reported that, overall, the management reports were useful and timely. The reports were useful for summarizing the information necessary to determine EPA's progress toward its response objectives. In the beginning of the response, there was some uncertainty on the format for the management reports and what information to include.

Some RMs (at the February 2018 meeting) and senior leaders noted that the management reports were repetitive and duplicative of regional reports. Feedback from senior managers and the Region 6 Hurricane Harvey hot wash indicated that management reports contained too much information, which made it difficult to find relevant data, such as permit and waiver information. Conversely, input from the Office of Water (OW) and the National Incident Coordination Team (NICT) indicated that management

reports did not contain some of the information needed during the response, such as the operational status on water facilities and information on debris management.

Senior managers discussed the requirement to develop two Situation Reports (SitReps) each day. Given the minimal personnel at Unified Command (UC), this required too much effort. In addition, there were instances in which conflicting SitReps caused inconsistencies in the reporting process because there was inadequate time to fully vet the content.

Intra-Agency Communications

Several senior managers characterized the PCC calls as successful with no miscommunication resulting from the calls. The Office of the Chief Financial Officer (OCFO) indicated that their staff were not included in the calls, but had historically participated in them for other incidents.

Documentation

A majority of responders indicated that they anticipated the documentation required to fulfill Freedom of Information Act (FOIA) requests. Feedback from responders, however, indicated that position-specific email addresses were not always used in the field. Although position-specific email addresses support fulfillment of documentation requests, they have been challenging to create and/or use. Fulfillment of FOIA requests could be further supported by establishing and communicating expectations that position-specific mailboxes always be used; and developing training, Standard Operating Procedures (SOPs), and position-specific guidance for Documentation Units.

Planning
Strengths and Best Practices
Crossover Support from Backup Regions. All impacted regions noted that crossover support from backup regions was a major strength of the response. Specifically, several noted the quality of the staff support from regional RSCs. Generally, the two-week deployments were appropriate as long as the regions had flexibility in rotation length, as needed, or for particular positions.
Intra-Agency Coordination. The response was generally well-coordinated within the Agency and communication was effective. The management objectives set appropriate expectations and the PCC calls and management reports helped ensure coordination.
Areas for Improvement and Recommendations
Field Deployment and Transition Mechanisms. Deployment and transition procedures/mechanisms were insufficient to ensure that deployed staff were adequately prepared upon arrival or that duties were efficiently transitioned from one individual to the next. <i>Recommendation:</i> The Agency should review and strengthen its deployment and transition procedures. This could include standardizing the template for deployment packages, conducting pre-deployment briefings to provide situational awareness, developing procedures for documenting and communicating field operational decisions, preparing/maintaining position-specific guidance

documents or conducting webinars on roles and responsibilities, or increasing the transition time for personnel.

RSC Program. While response needs were generally met, the RSC program needs to be maintained or strengthened to ensure it has the appropriate capability and depth to ensure appropriate staffing for similarly complex or concurrent events.

Recommendation: Conduct a needs assessment of the RSC program. The breadth and depth of the RSC cadre needs to be reviewed to ensure appropriate staffing for future response efforts.**

Management Reports. While management reports were helpful during the response, EPA needs to continue to improve what is addressed in these reports and how data, information, and metrics are displayed.

Recommendation: There should be a standard outline that all regions follow, with enough flexibility to adapt the reports to different circumstances.**

** This recommendation is currently being addressed by the Agency.

PUBLIC INFORMATION

This section presents an analysis of public information capabilities, including outreach and community involvement coordination, which apply to all four incidents.

Outreach

Managers and staff reported that the process of obtaining approval from HQ for outreach materials was slow. This led to delays in disseminating information to the affected communities, and underscored the need to anticipate public information needs ahead of time.

EPA developed story maps to provide a succinct, visual way to provide information on its response efforts. However, the RMs and others noted that the story map process needed improvements as it took too long to produce the story maps for a response. These could include developing a standard review/approval process, standard language and approaches, and a process for updating/maintaining data and content.

Translation services were needed throughout the response and were not available in a timely manner for Hurricane Harvey. EPA needs to prepare and obtain translated materials on common issues (e.g., mold) in advance, and have a translation contract in place as was available during responses to Hurricanes Irma and Maria.

One best management practice identified in the California Wildfire response was the after-hours attendance of EPA responders at community meetings. A similar practice is recommended for future responses.

Community Involvement Coordinators

Community Involvement Coordinators (CICs), also referred to as Community Liaisons during the Harvey response, were deployed to affected communities and interacted with local officials, community-based organizations, and community members. In Region 6, they reported receiving positive feedback from community members for EPA's work, which was partly attributed to their active role.

Region 3 identified a lack of training for CICs as a weakness in its hot wash. More training and job aids for CICs (e.g., CIC desk guides) were needed on roles and responsibilities, and anticipated challenges. Additionally, Region 7 discussed in its hot wash the need to ensure that CIC deployments are driven by response objectives and connected to operations.

Feedback from CIC and Public Information Officer (PIO) responders from all responses indicated that the CICs coordinated their response efforts with regional PIOs all or most of the time. In addition, a majority of responders felt that the PIOs and CIOs did a good job with the coordination.

Crisis Communication Plan

Implementation of the Crisis Communication Plan (CCP) was not apparent to EPA staff or not fully implemented. In an interview, public affairs staff noted the need to revise the CCP to include state and local partners, as well as add internal partners such as the OCFO for budget management and the Office of Administration and Resources Management (OARM) for oversight of the safety, health and environmental management programs. It was also noted that pre-deployment briefings should include information about the CCP activation.

Public Information
Strengths and Best Practices
Translation Contract. Having a national translation contract in place prior to the responses to Hurricanes Irma and Maria allowed the Agency to provide more timely information in multiple languages, and should be continued.
Areas for Improvement and Recommendations
Outreach Materials. The time required to develop and for the Office of Public Affairs (OPA) to approve outreach materials (e.g., factsheets and story maps) delayed the prompt release of response information. <i>Recommendation:</i> The Agency should develop factsheet templates, draft stock language, and prepare general factsheets on common issues related to disaster response to ensure that outreach materials are developed and released more quickly in the future.**
** This recommendation is consistent with recommendations from the annual EPA Response Readiness Evaluation Program and is currently being addressed by the Agency.

LOGISTICS

This section presents an analysis of logistics capabilities, including the PRL, lodging, and resources, which apply to all four incidents.

Personnel Resource Log

EPA staff received training on PRL prior to Hurricane Harvey. However, regions did not fully utilize it at first. As the 2017 response season evolved, PRL was increasingly used by the regions. Regions noted at the July 2018 RM face-to-face meeting that PRL is a significant upgrade to the prior system (Asset Tracker). All regions need to fully utilize PRL in the future and additional training is needed to ensure appropriate knowledge of the system. Annual refresher training is also needed since the system is only used during a response and exercises.

Lodging

Reserving rooms during the responses was challenging. In general, availability, cost, and contracting arrangements were barriers to securing appropriate lodging solutions. Region 2 reserved rooms as needed through a purchase card. This process was difficult to manage with the lack of hotel space, the ability to lose rooms when they were not blocked, and because lodging options were not available through the U.S. Federal Emergency Management Agency (FEMA). In addition, EPA often competed with other response agencies for lodging space.

Resources

In the Environmental Response Team (ERT) After-Action Survey, responders reported limitations with supplying power to essential resources during the Harvey, Irma, and Maria responses. Feedback suggested the Agency deploy more self-sufficient equipment, and evaluate power and coverage needs. This includes evaluating both solar and battery options for 24/7 power availability and portable satellite options, such as Broadband Global Area Network (BGAN) units, for ensuring communication and data transmission capabilities.

Logistics

Strengths and Best Practices

Personnel Resource Log. PRL has appropriate functionality and proved valuable during responses to incidents by enabling supervisors to know the status of their personnel. PRL also assisted the Emergency Operations Center (EOC) and Regional Emergency Operations Centers (REOCs) with their planning efforts by identifying resource gaps and skill sets needed. As such, it should be standardized as the resource ordering tool for EPA.**

Areas for Improvement and Recommendations

Lodging for Response Personnel. Options and procedures for securing appropriate lodging for response personnel need to be developed.

Recommendation: Develop a nationally consistent solution to how lodging needs can be met. As appropriate, coordinate with OARM to work with contracting officers (COs) on potentially utilizing room blocks as an option.**

** This recommendation is currently being addressed by the Agency.

FINANCE

This section presents an analysis of finance capabilities, including financial management and time reporting and pay, which apply to all four incidents.

Financial Management

RMs made several findings regarding financial management, including:

- **Finance – Procurement of Equipment under a Mission Assignment (MA).** There was a lack of understanding surrounding the purchase of equipment using Stafford Act funding. Questions regarding equipment ownership and final disposition delayed this process.
- **Finance – Emergency and Rapid Response Services (ERRS)/Superfund Technical Assessment and Response Team (START) Contract Capacity.** During the responses, Regions 2 and 4 quickly used the available contract capacity for both the ERRS and START contracts, and Region 6 had a similar issue with their Logistics/Warehouse contract. Placing additional funding on the contracts to continue the work was a challenge.
- **Finance – Agency Reimbursable Limit.** EPA has a reimbursable limit for the Agency, which can prohibit additional MA funding unless it is lifted.

Additionally, OEM had daily meetings with OCFO and regional comptrollers throughout the response. Reflecting on the response, the OCFO discussed that while their representatives participated in daily meetings with OEM and the regions, the OCFO NICT representatives were not included.

A senior leader from OCFO also expressed that an OCFO person should staff the finance desk, and the OCFO NICT members were not aware of the finance issues that arose.

Time Reporting and Pay

Many responders felt they were not adequately briefed or provided with timely guidance on timekeeping procedures. This included not receiving appropriate accounting codes in a timely manner and receiving contradictory instructions. Responders, particularly from the Hurricanes Irma and Maria responses, also noted they did not receive overtime pay in a timely manner given that Region 2 submitted waivers by pay period, which is inconsistent with the current guidance (90 days). Similarly, feedback from regions, senior managers, and a majority of responders indicated that the pay cap waiver process was not consistent across the regions.

Under the recently implemented People Plus 9.2 system, the host region could not access outside regional responders charging to a specific MA for salary and premium pay. This created a problem because the regions could not make quick adjustments to payroll charging as MAs were adjusted.

Finance

Strengths and Best Practices

OEM met daily with OCFO and the regional comptrollers, which facilitated better communication about time reporting information to responders. This practice should be continued and expanded to include others, as appropriate.

Areas for Improvement and Recommendations

Time Reporting and Pay. Time reporting and pay policies, procedures, and processes need to be communicated and implemented in a timely, consistent manner. There was a lack of consistency in the pay cap waiver process.

Recommendation: Time reporting and charging guidance should be provided in a timely manner and fully implemented during responses. Regions should follow existing guidance on pay cap waivers and the pay cap waiver process.

HEALTH AND SAFETY

This section presents an analysis of health and safety capabilities, including critical incident stress management (CISM) operations, and safety requirements and training, which apply to all four incidents.

Critical Incident Stress Management Operations

The majority of responders reported that they were aware of the CISM team before deployment but did not interact with any CISM team members. However, about 25% of the responders also reported that there were occasions where they felt that speaking with someone about the stresses of the response would have been helpful. RMs identified the need for more CISM-trained personnel and that responders needed better access to CISM personnel in the field.

Safety Requirements and Training

RMs at the February 2018 meeting reported the need for national consistency of health and safety requirements across regions. Regional Safety, Health, and Environmental Management Program (SHEMP) Management Guidelines were not aligned across regions at the beginning of the response.

In a consolidated effort to streamline health and safety deployment requirements for all regions impacted by the hurricanes, ERT pulled together several Health and Safety Program contacts and SHEMP Managers to discuss the minimum criteria needed to deploy everyone to support the hurricane response activities. It was reviewed by HQ and RMs, and, for the first time, EPA had all 10 regions and HQ onboard and in agreement on the minimal level of field health and safety prerequisites, and criteria that should be required of all EPA staff to meet prior to being deployed for hurricane response work. The Pre-Deployment Health and Safety Matrix outlines the minimum health and safety criteria that EPA staff are expected to meet in order to be eligible for deployment.

Health and Safety Briefings

Most responders received an initial site safety briefing upon arrival at the impacted region. In addition, most responders received comprehensive daily site safety briefings.

Health and Safety
Strengths and Best Practices
Health and Safety Matrix. The Pre-Deployment Health and Safety Matrix was an effective tool to identify criteria for staff before deployment and should be maintained for future responses.
Health and Safety Briefings. Most responders received an initial site safety briefing upon arrival at the impacted region. In addition, most responders received comprehensive daily site safety briefings.

Areas for Improvement and Recommendations

CISM Operations and Staffing. While most response personnel did not access CISM services, many indicated that speaking to someone would have been helpful. CISM should have an increased presence in the field and responders need better access to CISM personnel.

Recommendation: Additional CISM-trained staff are needed to meet the needs of future responses. CISM operations and outreach should be reviewed to ensure that response staff have a reliable way to access services as needed.

OPERATIONS

This section presents an analysis of operations capabilities, including field Incident Command System (ICS) implementation, interagency coordination, Emergency Support Function #13 (ESF-13) support, HQ Emergency Operations Center (EOC) operations, and infrastructure systems, which apply to all four incidents.

Incident Command System Implementation

Incident Management Team

At the February 2018 RM face-to-face meeting, RMs discussed the need for a concept of operations to standardize how Incident Management Teams (IMTs) are run to help ensure consistency across the regions. Additionally, feedback from the ERT AAR Survey indicates that there was a lack of consistency in command and control with respect to how personnel operated both within and between responses. In particular, some responders noted that it was sometimes unclear who was in charge when command and control originated from a regional office but there was also an IC in the field. Additionally, having multiple ICs in multiple locations for the same response caused further confusion.

ICS Training

While many responders indicated their training prepared them well for the response, others indicated that additional ICS training would be beneficial, including for the water teams and the Caribbean Environmental Protection Division. Feedback from senior managers and responders revealed that more ICS and Stafford Act training is needed for responding personnel. KLP classes need to be updated [i.e., Safety Officer (SO)/Assistant Safety Officer (ASO), Environmental Unit leader (ENVL), Situation Unit Leader (SITL), and Liaison Officer (LNO)]. In addition, regions should ensure their RSC and KLP members are able to meet their ICS training needs, such as by providing refresher training and providing training for additional positions. The ICS for Executives on-boarding video should be supplemented to include an emphasis on the appropriate use of authorities under the National Contingency Plan and Stafford Act. This training should be provided to senior leaders on an ongoing basis and be a requirement as a bi-annual refresher training.

Managers also recognized the need for newly trained staff [RSC and non-On-Scene Coordinator (OSC) KLP support positions] to have more experience prior to deployments. It is suggested that guidance be developed requiring that certain KLP positions [e.g., SO, Finance/Administration Section Chief (FSC), and ENVL] require prior work-related experience before selection to a KLP position.

Scientific Support Coordinator

A best management practice identified for Region 6 was the utilization of a Scientific Support Coordinator (SSC). The SSC role was guiding and crucial and provided continuity to ensure successful handover of the ENVL and is recommended as a best management practice for other regions. In Region 6, the position was filled but not officially recognized on the ICS organization chart.

Inter-Agency Coordination

In each of the responses, regions experienced coordination challenges with other federal agencies, specifically FEMA, the U.S. Army Corps of Engineers (USACE), and the U.S. Coast Guard (USCG). Challenges with FEMA primarily involved the issuance of MAs. A senior manager reported that MAs were not issued consistently across regions, causing confusion. The issuance of MAs was also challenging because FEMA favored creating new assignments over amending existing ones. The Hurricane 2018 National-Level Exercise meeting also noted that there was poor coordination between states and FEMA regarding MAs. Discrepancies in the versions of WebEOC between state and EPA systems further added to coordination difficulties.

Tasking was an issue between regions and FEMA, USACE, and USCG. This involved confusion over roles and contracting inadequacies in addressing drinking water systems, managing spills, and conducting asbestos assessments. Under Emergency Support Function #3 (ESF-3), FEMA and USACE did not have the resources to address non-utility public drinking water systems. FEMA approached EPA requesting assistance with infrastructure repairs and power generation issues. FEMA issued an MA to EPA late in the response to support the work, and had difficulties staying consistent on the requirements that allowed a system to be supported under the MA.

The agencies within ESF-10 worked well together. The USCG received its own MAs, which has improved EPA's response by reducing the administrative burden of tracking USCG costs.

According to the lessons learned developed by the RMs, implementation of the EPA Response Management System (RMS) under EPA Order 2071, dated 10/27/2016, *National Approach to Response*, is not known to all responders.

Field Operations

Senior leaders from the Office of Resource Conservation and Recovery (ORCR) noted that there was less of an emphasis on debris management at the senior level. Unlike past responses, there was very little information on where or how debris waste was disposed of after the hurricanes. More recently, RMs commented that federal agencies were not aligned on the disposition of vegetative/non-hazardous debris as during past storms. Because the State, Territory, and Commonwealth decided to address the debris through disposal, mulching, composting, etc., the debris issues are still not fully resolved.

Support for Emergency Support Function #13

In its After-Action Report, the EPA Criminal Investigation Division (CID) noted that there is limited knowledge and support for ESF-13 within the Agency. ESF-13 missions were not fully integrated into ICS. The absence of established specific infrastructure, guidelines, and protocols created significant administrative challenges and stressed deployed and non-deployed leadership.

Headquarters Emergency Operations Center Operations

The HQ EOC supported all four responses and conducted a survey of RSC volunteers. Key findings that relate to all responses include:

- 90% of respondents agreed (or strongly agreed) that their time in the EOC benefited the Agency response.
- 95% of respondents agreed (or strongly agreed) they would recommend volunteering in the EOC to a colleague.
- 83% of respondents agreed (or strongly agreed) that they understood what was expected of them while working in the EOC.
- 78% of respondents agreed (or strongly agreed) that they had the data needed to answer requests from leadership.
- 58% of respondents agreed (or strongly agreed) that coordination between the regions and the EOC was successful, while 30% of respondents were neutral.
- 73% of respondents agreed (or strongly agreed) that use of SharePoint in the EOC added value to the Agency's response efforts.
- 71% of respondents agreed (or strongly agreed) that data management between the situation units (SITs) at HQ and the regions was a success, while 21% were neutral and 7% disagreed.

In addition, the RMs identified an issue with EOC/Regional Emergency Operations Center (REOC) funding. During this response, FEMA began questioning the ongoing support during the Maria response of the HQ EOC and the Region 2 REOC funding under the initial MA received for this purpose. The compromise was to transfer the funding support to an operational MA that would eventually include a cost share.

ORCR staff noted that there was some confusion regarding the need for a waste desk staffed in the EOC. ORCR identified and trained staff, but then were told they were not needed after staffing the desk for a few days. For the Superstorm Sandy response, there was a virtual waste desk. It was not clear if the waste desk was virtual or was simply not staffed during the response, and the program felt there would have been value in having the waste desk staffed and to better understand how decisions are made in its absence. It was recommended that OEM provide training so that personnel supporting the EOC are prepared and ready to participate. The training should include a summary of all the possible EOC personnel needs so that other program managers know what is needed and have personnel ready to participate.

Infrastructure Systems

While the water team was not part of the MA for the wildfire response, they were involved in the response and recovery efforts. For the hurricane responses, discussions at the Groundwater Protection Council (GWPC) conference generally noted that coordination between EPA and the states was smooth, though most noted challenges related to information exchange and data management, which are further described in the individual sections that follow.

Operations

Strengths and Best Practices

National Assets. All three national assets were deployed at a high level of operational readiness which enabled EPA to meet the needs of several complex responses.

HQ EOC. Most EOC volunteers believed they had a positive impact on the Agency response and would recommend volunteering in the EOC to a colleague.

Areas for Improvement and Recommendations

ICS Training. While many responders indicated their training prepared them well for the response, others indicated that additional ICS training would be beneficial, including for the water teams and the Caribbean Environmental Protection Division (CEPD). In addition, additional ICS and Stafford Act training is needed for response personnel.

Recommendation: Additional ICS and Stafford Act training should be provided for response personnel, with an emphasis on training for KLP positions that lack adequate depth (i.e., SO/ASO, ENVL, SITL and LO) and senior executives.**

IMT Operations. Responders noted that regions had varying approaches to running IMTs, which could impact the effectiveness of backup region support.

Recommendation: An Agency-wide concept of operations should be developed for how to run an IMT to ensure consistency across the regions (e.g., applicable situations, roles and responsibilities, etc.).

Federal Coordination. Tasking between EPA and other federal agencies was challenging. For example, coordination needs to be improved between FEMA and EPA on the issuance of MAs and how EPA is tasked to provide drinking water and wastewater assistance. The Agency should also further coordinate with FEMA and USACE on contracting strategies, particularly related to asbestos assessments and removals. Tasking was also unclear between EPA and the USCG, which will require a discussion at a national level and issues/decisions documented in writing during a response.

Recommendation: EPA should further coordinate with federal partners, including USCG, USACE, and FEMA to ensure a common understanding of roles and clarity in tasking (e.g., drinking and wastewater assistance; coverage for REOCs and HQ EOC under the MA; and issuance of multiple, short-term amendments).

ESF-13 Support. There is limited knowledge and support of the ESF-13 mission within the Agency. ESF-13 missions were not fully integrated into ICS.

Recommendation: CID and other response personnel should be trained on the ESF-13 mission, concept of operations, and stakeholder roles. If CID continues to support ESF-13 operations, they should take ICS 300/400 training and receive more On-the-Job Training (OJT) to increase familiarity with ICS structures and functions, and response plans should be considered.

Drinking Water and Wastewater System Data Needs. Data needs for drinking water and wastewater systems need to be better understood and coordinated with OW, with the understanding that states track data differently.

Recommendation: Data management plans need to recognize that states may track different information but still need to provide a mechanism for EPA to access data on drinking water and wastewater systems during responses.

** This recommendation is consistent with recommendations from the annual EPA Response Readiness Evaluation Program and is currently being addressed by the Agency.

DATA MANAGEMENT

This section presents an analysis of data management capabilities, which apply to all four incidents.

Data collection platforms (like Collector or Survey 123) were effective in Regions 4 and 9 and should be standard for the program. However, data collection caused issues during the responses, as it was not always adequately tracked, leading responders to duplicate efforts. Data management staff noted the need to refine data collection forms to include information or data specifically needed by EPA HQ (e.g., OW data needs). The regions also need to hold training sessions on data collection and data management. There should be a SOP for managing personally identifiable information so that it is appropriately secure.

EPA needs to formalize the various EPA ICS data positions and train to those positions. Each region should be encouraged to form a data group – people with the ability to come together quickly and design the architecture of a response-specific data plan from the outset.

Data Management
Strengths and Best Practices
Data Collection Platforms. Use of tablets and data collection platforms (e.g., Collector or Survey 123) worked well and should be expanded in the future.
Areas for Improvement and Recommendations
<p>Data Collection and Management Procedures. Incident-specific data collection and management protocols were not communicated across the regions, HQ, and other response partners.</p> <p><i>Recommendation:</i> Standard protocols for data collection and management should be developed and formalized. For example, regions should also coordinate with various response partners, including the HQ EOC, to understand data needs and responsibilities, develop standard queries, and provide training on data collection and management.**</p>
** This recommendation is consistent with recommendations from the annual EPA Response Readiness Evaluation Program and is being addressed by the Agency.

CONCLUSION AND RECOMMENDATIONS

This section presents significant program strengths and areas for improvement by capability. A full list of recommendations across all responses is available in Appendix F.

The following table summarizes the main strengths of all four responses.

Capability	Strengths
Planning	Regions noted that crossover support from backup regions was a major strength of the response The response was generally well-coordinated within the Agency and communication was effective
Public Information	The national translation contract allowed timely outreach
Logistics	PRL has appropriate functionality and proved valuable
Finance	OEM had daily meetings with OCFO and regional comptrollers
Health and Safety	The Pre-Deployment Health and Safety Matrix was effective Most responders received an initial site safety briefing upon arrival and daily site safety briefings
Operations	EPA deployed all three of its national assets to support the response Most EOC volunteers believed they had a positive impact on the Agency response
Data Management	Use of tablets and data collection platforms worked well

The following table summarizes the main areas for improvement of all four responses.

Capability	Areas for Improvement and Recommendations
Planning	Review and strengthen deployment and transition procedures The breadth and depth of the RSC cadre needs to be reviewed to ensure appropriate staffing** There should be a standard management report outline that all regions follow
Public Information	Develop factsheet templates, draft stock language, and prepare general factsheets to ensure outreach materials are developed/released in a timely manner**
Logistics	Develop a nationally consistent solution to how lodging needs can be met and standardize PRL as the resource ordering tool**
Finance	Time reporting and charging guidance should be provided and fully implemented in a timely manner
Health and Safety	Additional CISM-trained staff are needed to meet response needs
Operations	Additional ICS and Stafford Act training should be provided for response personnel, with an emphasis on training for KLP positions that lack adequate depth and senior executives** Develop an Agency-wide concept of operations for how to run an IMT Coordinate with FEMA to clarify inconsistencies with MA and amendment issuance CID and other response personnel should be trained on the ESF-13 mission, concept of operations, and stakeholder roles

	Coordinate with OW to identify data needs for drinking water and wastewater systems
Data Management	Standard protocols for data collection and management should be developed and formalized**
** This recommendation is consistent with recommendations from the annual EPA Response Readiness Evaluation Program and/or is being addressed by the Agency.	

APPENDIX A: ACRONYMS AND ABBREVIATIONS

AAR	After-Action Report
ACM	Asbestos-Containing Material
ASO	Assistant Safety Officer
ASPECT	Airborne Spectral Photometric Environment Collection Technology
BGAN	Broadband Global Area Network
CCP	Crisis Communication Plan
CEPD	Caribbean Environmental Protection Division
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIC	Community Involvement Coordinator
CID	Criminal Investigation Division
CISM	Critical Incident Stress Management
CL	Community Liaison
CMAD	Consequence Management Advisory Division
CO	Contracting Officer
COTP	Captain of the Port
DMP	Data Management Plan
ENVL	Environmental Unit Leader
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
ERRS	Emergency and Rapid Response Services
ER	Emergency Response
ERT	Environmental Response Team
ESF-3	Emergency Support Function #3
ESF-10	Emergency Support Function #10
ESF-13	Emergency Support Function #13
EU	Environmental Unit
FEMA	U.S. Federal Emergency Management Agency
FL DEP	Florida Department of Environmental Protection
FOIA	Freedom of Information Act
FOSC	Federal On-Scene Coordinator
FRP	Facility Response Plan
FSC	Finance/Administration Section Chief
FWC	Florida Fish and Wildlife Conservation Commission
GIS	Geographic Information System
GPO	Government Printing Office
GPS	Global Positioning System
GWPC	Groundwater Protection Council
HASP	Health and Safety Plan
HAZMAT	Hazardous Materials
HHW	Household Hazardous Waste
HQ	Headquarters

IAP	Incident Action Plan
IC	Incident Command
ICP	Incident Command Post
ICS	Incident Command System
IMH	Incident Management Handbook
IMT	Incident Management Team
IT	Information Technology
JFO	Joint Field Office
JOFOC	Justification for Other than Full and Open Competition
KLP	Key Leadership Position
LNO	Liaison Officer
LSC	Logistics Section Chief
MA	Mission Assignment
NCERT	National Criminal Enforcement Response Team
NDOW	Natural Disaster Operational Workgroup
NGO	Nongovernmental Organization
NICT	National Incident Coordination Team
N-IMAT	National Incident Management Assistance Team
NIMS	National Incident Management System
NIT	National Incident Management System Integration Team
NLE	National Level Exercise
NPL	National Priorities List
OARM	Office of Administration and Resources Management
OCEFT	Office of Criminal Enforcement, Forensics and Training
OCFO	Office of the Chief Financial Officer
OEM	Office of Emergency Management
OJT	On-the-Job Training
OPA	Office of Public Affairs
OPS	Operations
ORCR	Office of Resource Conservation and Recovery
OSC	On-Scene Coordinator
OW	Office of Water
PCC	Policy Coordinating Committee
PHILIS	Portable High-throughput Integrated Laboratory Identification System
PIO	Public Information Officer
POC	Point of Contact
PPE	Personal Protective Equipment
PRL	Personnel Resource Log
PSC	Planning Section Chief
RA	Regional Administrator
REOC	Regional Emergency Operations Center
RESL	Resource Unit Leader
REST	Representational State Transfer

RIC	Regional Incident Coordinator
RM	Removal Manager
RERT	Radiological Emergency Response Team
RMP	Risk Management Plan
RMS	Response Management System
RRCC	Regional Response Coordination Center
RSC	Response Support Corps
RSF	Recovery Support Function
SEOC	State Emergency Operations Center
SHEMP	Safety, Health, and Environmental Management Program
SIT	Situation Unit
SITL	Situation Unit Leader
SitRep	Situation Report
SO	Safety Officer
SOC	State Operations Center
SOP	Standard Operating Procedure
SSC	Scientific Support Coordinator
START	Superfund Technical Assessment and Response Team
TAGA	Trace Atmospheric Gas Analyzer
TCEQ	Texas Commission on Environmental Quality
TGLO	Texas General Land Office
TPWD	Texas Parks and Wildlife Department
UC	Unified Command
UIC	Underground Injection Control
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USFWS	United States Fish and Wildlife Service
USVI	U.S. Virgin Islands

APPENDIX B: DATA SOURCES

Feedback from EPA Response Personnel

EPA collected feedback from response personnel using a variety of data sources, as described below. Because this report covers multiple incidents involving a significant number of Agency staff, OEM relied on a survey to collect information, which was supplemented with interviews and other data sources, as described below. OEM developed a questionnaire to collect information from EPA staff on various aspects of response activities. The questionnaire was distributed via an online survey tool to ensure consistent, efficient data collection. The survey included 245 questions targeted to specific response roles, including CIC/PIO, data management, ESF-10 coordination/communication, finance, logistics, operations, planning, REOC utilization, health and safety, and Water Team operations.

The survey was distributed to a sample of regional staff who played a response role, as selected by RMs in each region. A limited number of randomly selected HQ staff also responded, including Special Team members. Exhibit 3 provides the number of survey respondents for each of the incidents evaluated. While this approach provided a significant amount of information, it is not (nor was it intended to be) a statistically significant survey given the modest sample size, sample population, and nature of the questions. As such, while some quantitative data are provided in this report, readers should remain mindful of the data's limitations.

Exhibit 3. Number of Responses to ERT AAR Survey

Incident	Regional Staff	HQ Staff	Special Team	Other*	Total
Hurricane Harvey	19	4	2	3	28
Hurricanes Irma/Maria	117	11	16	14	158
California wildfires	24	1	2	1	28

* "Other" respondents included staff from EPA laboratories, outpost offices, the Gulf of Mexico Program, the El Paso Border Office, etc.

Headquarters Emergency Operations Center Survey

HQ EOC staff developed a separate online survey that was sent to 83 EOC volunteers for all incidents from the 2017 Disaster Response Season (Hurricane Harvey, Hurricanes Irma/Maria, and the California wildfires). There were 41 respondents. The survey consisted of 15 general questions and 5 position-specific questions each for Resources Unit, SIT, Technical Specialists (Water, Agency for Toxic Substances and Disease Registry, etc.), PIO, and LNO. Data were not collected based on specific incidents; only the response season as a whole.

Environmental Response Team Survey

The ERT collected feedback via an online survey tool from its members on planning, command/control, process, and level of response. They were asked to reflect on what went well and where there were areas of concerns, including the impact on operations and potential solutions to consider. There were 17 respondents to the survey from the ERT.

Senior Management Interviews

To supplement the survey data, OEM conducted one-on-one interviews with senior leaders from the regions as well as various EPA HQ offices. These findings are integrated into the incident-specific sections below to ensure the perspectives of various parts and levels of the Agency are represented. The interviews provided an opportunity to seek additional context regarding the strengths and areas for improvement in EPA's response operations.

Other After-Action Reports and Hot Washes

Some EPA regions, programs, and groups conducted hot washes specific to their roles in response operations. In some cases, OEM participated in these discussions or was otherwise provided with summary notes for purposes of including their feedback in this AAR. Where possible, the report includes specific findings and recommendations to ensure that it represents a broad spectrum of issues and recommendations related to the Agency's response efforts.

Exhibit 4. Related After-Action Reviews and Hot Washes

Information Source	Date	Organization
Senior Leader Hot Wash	May 2018	EPA
EPA ESF-10 2017 Fall After-Action Discussions and Issue Tracking	December 2017	EPA
Hurricane Irma (Region 4) 2018 OSC Academy Presentation	March 2018	EPA/OEM
Hurricane Lessons Learned for NLE 2018 Meeting	January 2018	EPA/OEM
Results from HQ EOC After-Action Review Survey	April 2018	EPA/OEM
Notes from RM's Meeting in Denver	July 2017	EPA RMs
Hurricane Harvey, Irma, Maria, and California Wildfire Lessons Learned Presentation	July 2018	EPA RMs
2017/2018 Disaster Response Lessons Learned	April 2018	EPA CMAD
Results of ERT AAR Survey	July 2018	EPA ERT
CID Emergency Support Function – 10 After-Action Review Report	February 2018	EPA CID
CID Emergency Support Function – 13 After-Action Review Report	February 2018	EPA CID
NIT March 2018 Meeting Summary	March 2018	EPA NIT
EPA Region 1 Hot Wash Meeting Notes	June 2018	EPA Region 1
EPA Region 2 Hurricane Irma-Maria Lessons Learned Work Plan	May 2018	EPA Region 2
Region 3 2017/2018 Hurricane Deployment Hot Wash	July 2018	EPA Region 3
Region 4 Hot Wash Notes	February 2018	EPA Region 4
Region 6 Hurricane Harvey Hot Wash	December 2017	EPA Region 6
Region 7 2017–18 Deployments Consolidated Lessons Learned	Spring 2018	EPA Region 7
NDOW Hurricane Harvey Hot Wash Summary	January 2018	NDOW
Notes from Hurricane 2017 Season Discussion at the 2018 UIC GWPC conference	February 2018	GWPC
TCEQ Hurricane Harvey Response After-Action Review Report	April 2018	TCEQ

Other Data Sources

Additional background materials and information on response activities were accessed from response.epa.gov, HQ management reports, and the PRL database (as analyzed via the 2017 ER Resources Qlik Application).

APPENDIX C: OVERVIEW AND ANALYSIS OF HURRICANE HARVEY RESPONSE

Incident Overview

In advance of Hurricane Harvey, EPA activated emergency response centers in Washington, DC; Dallas, Texas; and Atlanta, Georgia. Prior to the storm, EPA personnel prepared to deploy if requested by the states impacted by the hurricane through FEMA. Hurricane Harvey hit the Texas Coast as a Category 4 Hurricane on August 25, 2017. An ESF-10 MA was signed on August 28, 2017. EPA, the TCEQ, the Texas General Land Office (TGLO), and the USCG established a UC in Corpus Christi to begin evaluation, cleanup, and recovery of spills, releases, and orphan containers. This UC was supported by three operational branches in Corpus Christi, Houston, and Beaumont. In addition, multiple agencies and groups supported each of the operational branches, including the Texas National Guard, 6th Civil Support Team; the Arkansas National Guard, 61st Civil Support Team; the Oklahoma Task Force 1; and the Texas State Guard Engineering Group.

Region 6 is a member of the NDOW, which was created after the response to Hurricane Ike to improve coordination between state and federal agencies operating under ESF-3 and ESF-10. Like the National Response Framework, the National Disaster Recovery Framework, and the National Incident Management System (NIMS), NDOW seeks to establish an operational structure and common planning framework. NDOW established a framework of SOPs, standardized data quality objectives, one common database system, and training/exercises for coordination of multiagency responses to manmade and natural disasters. Additional agencies that participate in NDOW include USCG District Eight, TCEQ, TGLO, the Texas Parks and Wildlife Department (TPWD), the National Oceanic and Atmospheric Administration, and United States Fish and Wildlife Service (USFWS). Region 6 has been involved in planning and participating in annual exercises to improve coordination with these response partners.

As of September 14, 2017, 263 EPA personnel were supporting the response efforts for Hurricane Harvey. For the first time in a response, EPA used all three of its national assets – the Airborne Spectral Photometric Environment Collection Technology (ASPECT) surveillance aircraft, the TAGA, and the Portable High-throughput Integrated Laboratory Identification System (PHILIS) mobile laboratories. EPA completed site assessments at all 43 Superfund Sites affected by the storm, and provided monitoring and response support to impacted industrial facilities. EPA and TCEQ water quality experts assisted both drinking water and wastewater system managers to restore service in towns throughout the impacted areas. EPA processed emergency fuel waiver requests and deployed Community Liaisons (CLs) to the local, county and state EOCs and FEMA Disaster Recovery Centers.

EPA Management Objectives

1. Ensure that health and safety of the EPA response is considered at all times.
2. Establish an incident management structure and processes employing the ICS to enable effective overall management of the event with deployment of resources (staff and equipment) in a rapid, aggressive, and well-coordinated manner.
3. Ensure prompt review and processing of fuel waiver requests.
4. Prepare for and provide rapid assessment of industrial facilities as requested by the state or under EPA's statutory program responsibilities for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Risk Management Plan (RMP), and Facility Response Plan (FRP) facilities. Working with our state partners, contact industrial sources within the impacted area to determine their operational status and what support can be provided with monitoring the start-up of industrial sources.
5. Prepare for and provide rapid assessment and technical assistance drinking water and wastewater facilities, as requested by the state or local government. EPA will support its state partners in contacting drinking water and wastewater systems.
6. Prepare a Sustained Response Plan that outlines the resource and equipment needs for a long duration response.
7. Activate the Agency's CCP to ensure effective and efficient coordination of all incident communications.
8. Encourage a collaborative federalism approach, where national, state, and local governments interact cooperatively and collectively to solve common problems.
9. Begin Agency internal and external coordination, under the National Disaster Recovery Framework, regarding Recovery Support Functions (RSFs) in which EPA is likely to be involved.

Summary of Personnel and Resources

The EPA response lasted from August 24, 2017 to September 28, 2017 (35 days). As shown in Exhibit 5, 251 EPA staff deployed from HQ and the regions to support the Hurricane Harvey response. Of these 251 staff, 44 were OSCs, 185 were RSC members, and 22 were non-RSC members. The 16 HQ staff, including 7 from the CMAD and 6 from ERT, served primarily in operations and planning roles.

Exhibit 5. Number of Individuals Deployed for Hurricane Harvey by Region/Office

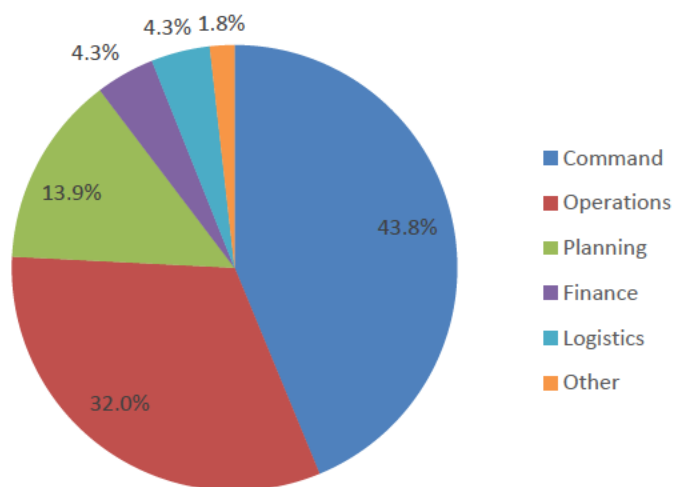
Home Region	Number of Individuals
HQ	16
1	2
2	5
3	7
4	3
5	9
6	139
7	62
8	1
9	3

10	4
Total	251

Source: 2017 ER Resources Qlik Application

The 251 staff completed 281 deployments. While most individuals only deployed once, 26 individuals deployed twice and 2 individuals deployed three times. The average length of an individual's deployment was 12.8 days. In total, EPA staff were deployed for 3,585 days in support of the incident. Exhibit 6 summarizes the roles served in the 281 individual deployments by ICS section.

Exhibit 6. Roles Served in Individual Deployments for Hurricane Harvey



Source: 2017 ER Resources Qlik Application

Analysis of Core Capabilities

The following sections provide an overview of the performance related to each core capability, highlighting strengths and areas for improvement.

Planning

This section presents an analysis of planning capabilities related to the Hurricane Harvey response, including development and implementation of management objectives, pre-deployment operations, development of demobilization and mobilization plans, personnel deployments, resource ordering, and documentation.

Management Objectives

During interviews, multiple senior managers discussed that the management objectives across responses were appropriate and helped guide response activities. Several felt that the process of developing management objectives was not "top down," allowing many opportunities for RMs and senior regional managers to provide their input. The management objectives for Hurricane Harvey were

tracked both with ESF-10 activities and assigned NPL responsibilities, and it was discussed how these objectives represented priorities and lessons learned from the Gold King Mine response. The objectives also helped maintain the ICS structure and align all the program offices.

However, in the Hurricane Harvey hot wash, NDOW discussed that some objectives were developed directly by senior management. This led to some Agency personnel being deployed without an expressed need from the field, creating the need to find tasking for additional personnel. For example, EPA deployed CICs that were not directly requested by the state.

Senior leaders would benefit from Stafford Act training to ensure that field staff and managers share a common understanding of response objectives. In addition, it would be beneficial to develop a Senior leader “quick-start guide” for emergency response activities, similar to what has been developed recently in Regions 2, 4, and 9.

Pre-deployment Operations

In the NDOW hot wash, pre-deployment coordination between EPA and state organizations was identified as a strength. Pre-planning calls and appropriate branch organization helped with the coordination. In addition, TGLO efficiently requested support for ESF-10 because they recognized early on the need for federal assistance.

NDOW noted that some agencies did not have a clear understanding of their initial roles and responsibilities, which could be clarified and explained through additional training and exercises. TPWD and USFWS were not utilized on Rapid Needs Assessment teams, as had been practiced in the past.

Mobilization/Demobilization Plans

Finalization of Mobilization/Demobilization Plans

Region 6’s Hurricane Harvey hot wash identified several challenges with the development of mobilization and demobilization plans. Timeliness was an issue when finalizing the mobilization plan. Delays were caused by the use of an outdated template and lack of clarity from HQ regarding compensatory time and overtime. The full demobilization plan was never finalized; however, a one-page summary was developed. The region suggests developing simple mobilization and demobilization plans. Despite these challenges, however, feedback noted that the mobilization and demobilization plans were very effective.

Mobilization and Demobilization Processes

Region 6’s hot wash discussed the lack of clarity around the mobilization and demobilization processes. Information regarding mobilization and demobilization was lengthy, making it difficult for responders to know what was expected of them.

Personnel Deployment/Activation

Deployment Packages

Prior to mobilization, responders should have received deployment packages with information on accounting, lodging, equipment/gear requirements, check-in/out procedures, People Plus charging, and/or demobilization. Feedback from staff, however, revealed that many responders did not receive formal deployment packages. A number of responders received phone calls or verbal notifications with deployment details. Respondents also commented that the deployment packages included incorrect information or minimal direction. In their hot wash, Region 6 noted that non-OSCs did not know what to

pack for their deployments, and that the content of deployment packages varied by region. Feedback from the ERT AAR Survey indicated that deployment schedules were not provided early enough.

Roles and Responsibilities

Several responders lacked information about their roles and responsibilities prior to activation/deployment. Several Harvey responders indicated that they did not know who to report to upon mobilization. A similar number of responders also reported that they were not provided adequate work assignment information, and some responders reported being deployed with little information about expectations.

Documentation

Most staff felt that they did a good job of anticipating the documentation needs that were required to fulfill FOIA requests. During the RM face-to-face meeting, the Region 6 RM discussed the need to have a Documentation Unit leader to help respond to FOIA requests. Similarly, at the NIT hot wash, staff noted that Region 6 had captured all of the necessary documentation, but organizing the documents and responding to specific FOIA requests were challenging.

Planning Strengths and Areas for Improvement

Strengths

- Pre-deployment coordination between the state and federal agencies for supporting ESF-10 responsibilities was smooth, effective, and efficient as a result of the efforts of the training and exercises by the NDOW.
- Most EPA staff deployed to support the Hurricane Harvey response felt that the length of their deployment was appropriate.

Areas for Improvement

- The mobilization and demobilization plans were slow to be finalized or not finalized, and the processes were unclear.
 - **Recommendation:** The demobilization and mobilization plans should be reviewed and simplified, and the Agency should develop updated templates for them.
- Some responders did not have a good understanding of their roles or responsibilities.
 - **Recommendation:** Provide additional training or webinars on various roles or responsibilities, such as data management/analysis, communications (e.g., public speaking, conflict management), leadership training, cultural training, stress management, and household hazardous waste (HHW) collection/pad management.

Public Information

This section presents an analysis of public information capabilities related to the Hurricane Harvey response, including community engagement, outreach materials, translation/language needs, and press inquiries.

Community Engagement

Community Liaisons

CLs were deployed to affected communities and interacted with local officials, community-based organizations, and community members. They reported receiving positive feedback from community members for EPA's work, which was partly attributed to the active role played by the CLs. However, several reports also discussed that there were not enough CL personnel that were deployed to the Corpus Christi and Houston areas.

Several responders expressed that CLs should have been on-the-ground earlier in the disaster. The first CLs did not arrive in Corpus Christi until at least two weeks after the hurricane. Consequently, community members had expressed needing information earlier, as some information (e.g., information on preventing mold) arrived too late to be useful. Additionally, in the Region 6 hot wash, it was identified that CLs were not integrated into the ICS structure. This issue was exacerbated by the logistics of the CL Coordinator working out of the Dallas office as opposed to the CLs who were deployed to the field, which created leadership challenges. Several people also reported that roles and responsibilities of the CLs could have been clearer. Furthermore, feedback indicated that CLs did not receive their mobilization packets until after their arrival. Despite these challenges, CLs were ultimately recognized in the Region 6 hot wash for their resilience, flexibility, and adaptiveness in executing their roles.

Attendees at the NIT meeting discussed the role of CLCs. During the response, the position did not have a clear direction or objectives, which impeded operations.

Environmental Justice

Environmental justice considerations were not sufficiently addressed in the response, as noted in the Region 6 hot wash and in an interview with a Region 6 manager. Environmental justice considerations are not currently integrated into the ICS structure, which may have contributed to a lack of understanding of the importance of the CL role.

Reporting

During the Harvey response, EPA did not release preliminary data or press releases about its activities early in the response, which could have provided objective information on the environmental conditions of impacted communities. Instead, EPA was more reactive than proactive in responding to press inquiries about the conditions of the Superfund NPL Sites.

Outreach Materials

Coordination and dissemination of public information materials were often made difficult by inefficiencies and logistical challenges. Responders reported that the approval of fact sheets was slow, despite much of the information already being available on EPA's website. This caused challenges given that the EPA factsheets could not be used without HQ approval. Responders also reported printing challenges, such as not having the permission to print when needed or needing more copies to fulfill public requests. Being unable to print enough fact sheets required some responders to provide information to community members through emails, which was problematic for individuals unable to access the internet. Responders also expressed the need to anticipate public information needs ahead of time and develop materials that address common issues related to this type of response (e.g., mold, air and water quality, drinking water). Staff in OPA noted that its relationship with response staff has improved in recent years.

Translation/Language Needs

Several respondents reported that translation services were not available when needed or not available soon enough during the response. There was a need for materials in Vietnamese and Spanish. Some community members were referred to the response website for translated materials in Spanish. For materials in Vietnamese, the materials on the website relevant to the public were poorly translated, and thus requests for additional Vietnamese materials had to go through HQ.

Press Inquiries

During the response, press reported misleading information that EPA was not conducting inspections at flooded NPL sites, which required management of significant media inquiries.

Public Information Strengths and Areas for Improvement

Areas for Improvement

- The process for releasing preliminary data to the public needs to be considered and documented.
 - **Recommendation:** Develop messaging templates to address communicating data to the public.
- CL roles and responsibilities were not clear or communicated soon enough, and CLs were deployed late in the response.
 - **Recommendation:** Coordinate with state and local agencies early in the response to identify their community outreach needs, provide sufficient guidance to CLs on their roles and responsibilities through training/webinars, and conduct pre-deployment briefings.
- Environmental justice was not adequately integrated in the response.
 - **Recommendation:** The Agency should consider integrating environmental justice considerations into the CCP, such as through coordination with nongovernmental organizations (NGOs) to maintain awareness of their concerns.
- There were challenges getting the fact sheets printed for public distribution.
 - **Recommendation:** Ensure deployed staff coordinate with regional staff who hold a Government Printing Office (GPO) Express Purchase Card to pay for printing or similar costs.
- Translation services were needed throughout the response and they were not available in a timely manner for Hurricane Harvey.
 - **Recommendation:** Translation services and materials should be prepared and their availability ensured before a response, such as by having pre-approved translated materials on how to deal with common issues (e.g., mold).
- There was a need to better anticipate possible media inquiries on response activities.
 - **Recommendation:** Issue press releases to the public on response activities and accomplishments proactively.**

Logistics

This section presents an analysis of logistics capabilities related to the Hurricane Harvey response, including contracting, lodging, resources, and staffing.

Contracting

The Region 6 hot wash identified that the region experienced warehouse/logistics contract issues regarding contract capacity. The low annual ceiling required a Justification for Other than Full and Open Competition (JOFOC).

Lodging

In their hot wash, Region 6 reported that the trailers obtained through the logistics contract were expensive. There was a 60-day contract for trailers, but field work did not last the entire length of the contract. In addition, warehouse/logistics contractors used the Region 6 trailers because they did not have the authority to obtain hotel rooms. A room block was not available to EPA responders to make hotel reservations at a government rate. FEMA blocked hotel rooms for affected individuals, leaving Region 6 to use trailers for personnel. The lack of hotels room negatively impacted the ability to mobilize EPA personnel.

Resources

Resource Ordering

As reported in the Region 6 hot wash, resources were ordered early in the response and delivered without communicating with field personnel. For example, in the ERT AAR Survey, it was expressed that management ordered both TAGAs to be mobilized, which was not recommended by people in the field. Operations was left dealing with the assets that were delivered early.

Additionally, a staff member in Logistics reported that staff were sent to them without Logistics having requested additional staff. This resulted in staff not always having proper training.

Branches often did not use forms from the previous operational period for updating, which required the planning section to redo forms and update organizational charts daily. The NIT coordinator discussed that these issues are being addressed as Resource Unit Leaders (RESLs)/Logistics Section Chiefs (LSCs)/FSCs are looking into conducting a webinar training on the 213RR ordering process to address some of these issues. In general, logistics should deal with equipment and personnel ordering, in conjunction with operations and planning, as needed.

Tracking

Excel was used to track 213RRs. Region 6 did not receive the 213RRs from HQ in sequential order, which caused confusion with the numbering. The 213RRs may not have been in sequential order because the forms come from HQ at various points in time, based on planned exercise events of real-world deployments. HQ will ship sequential forms out to the regions in 50-form batches, but there is no guarantee that they will be used sequentially.

iPads

START was unable to provide or rent iPads to state or other employees that were a part of NDOW, and EPA was not able to use MA funds to issue iPads to the state. Ultimately, USCG was able to rent iPads for

the state to use. Some regional iPads, however, were not global positioning system (GPS) capable. Without GPS capabilities on the iPads, responders experienced location problems when filling out the forms. In addition, there were issues with closing out points from the iPads, causing data lags.

Logistics Strengths and Areas for Improvement

Strengths

- Obtaining trailers through the logistics contract provides flexibility to ensure lodging needs are met. However, given costs, other options should be explored, if practical.

Areas for Improvement

- Region 6 quickly used the available contract capacity for the Warehouse/Logistics contract, which required the use of a JOFOC.
 - **Recommendation:** The Agency should review the process for monitoring available contract capacity at the regional and HQ levels.
- Resource ordering did not follow the ICS process.
 - **Recommendation:** Consider process improvements such as staging areas where resources can be initially sent, ICS and Stafford Act training for senior leaders, and ensuring that the Logistics Section is in charge of resource ordering with appropriate input from Operations/Planning and senior management. In addition, the Agency should train and recruit more RSC for logistics.**

** This recommendation is consistent with recommendations from the annual EPA Response Readiness Evaluation Program and is being addressed by the Agency.

Finance

This section presents an analysis of finance capabilities related to the Hurricane Harvey response, including financial management and time reporting and pay.

Financial Management

The Region 6 hot wash and responder feedback indicated that there was a need for more ICS-trained and experienced FSCs. Region 6 stated that the FSC needs experience working in the finance systems on a day-to-day basis. The region also reported that staffing was insufficient. A finance person was needed at each branch to help track the burn rate, and all Incident Management Handbook (IMH) positions needed to be filled.

Time Reporting and Pay

Responders employed a mix of formal and informal mechanisms to keep track of time daily. A majority used formal sign-in/out sheets. However, additional methods such as informal tracking on paper or Excel, People Plus, or other online timekeeping systems were used. Logistics personnel additionally reported that they did not think that an effective sign-in/sign-out procedure was developed and implemented consistently throughout the response and that the procedure reportedly changed

throughout the response. In their hot wash, Region 6 also discussed the need for remote check-in capabilities.

Few responders reported that they were well-briefed on timekeeping and charging procedures before deployment. Due to the quick nature of the mobilization, guidance was not immediately available. A larger majority of responders felt that they were well-briefed after deployment compared to before deployment. Harvey responders indicated that there should be consistency across the regions in the pay cap waiver process.

Finance Strengths and Areas for Improvement

Strengths

- Pay cap guidance was followed by responders and overtime was often paid in a timely manner.

Areas for Improvement

- More personnel support is needed for finance.
 - **Recommendation:** All IMH finance positions should be filled and personnel with prior finance work experience should be recruited to take FSC KLP training. In addition, all finance staff should receive Stafford Act training.**
- An effective sign-in/sign-out procedure was not developed and implemented throughout the response.
 - **Recommendation:** The NIMS Integration Team should develop an electronic platform that regions can utilize for sign-in/out during large responses, perhaps through WebEOC.

** This recommendation is consistent with recommendations from the annual EPA Response Readiness Evaluation Program and is being addressed by the Agency.

Health and Safety

This section presents an analysis of health and safety capabilities related to the Hurricane Harvey response, including safety briefings, safety requirements and training, and personal protective equipment (PPE) and safety supplies.

Safety Briefings

Among those not stationed in the REOC, a majority of responders reported receiving an initial site safety briefing upon arriving at the impacted region.

Safety Requirements and Training

Respondents reported that their level of field safety training was adequate for the work they performed. Additionally, increased requests for EPA vaccinations/screenings were reported to be manageable by health units. Certain requirements, however, impacted deployments. The 24-hour field safety training requirement for deployed RSCs, and vaccinations and pre-deployment medical screening requirements

delayed deployment. Consequently, regional RSC coordinators and regional SHEMs should coordinate to ensure consistency across regions on safety training requirements and to ensure there is clarity and agreement on the requirements.

PPE and Safety Supplies

A majority of responders reported that safety supply shortages did not occur during their deployments. Responders also overwhelmingly reported having proper PPE. The main shortages that occurred were with bottled water. Several responders reported that they did not have an adequate quantity available to them, which led to them making personal purchases.

Health and Safety Strengths and Areas for Improvement

Strengths

- Most responders received an initial site safety briefing upon arrival at the impacted region.
- Most responders received comprehensive daily site safety briefings.
- Responders felt that their level of field safety training was adequate for the work they performed.
- The increased requests for EPA vaccinations/screenings were manageable by the health units.
- Safety supplies were adequate.

Areas for Improvement

- None noted.

Operations

This section presents an analysis of operations capabilities related to the Hurricane Harvey response, including ICS Implementation, REOC operations, ESF-10 and ESF-13 operations, use of national assets, interagency coordination, and infrastructure systems.

ICS Implementation

ICS Structure

A majority of responders reported that the ICS process was well-followed during the Harvey response. Additionally, the Region 6 hot wash identified a need for senior leaders to follow ICS concepts. Senior manager interviews further highlighted that there is a need for more and expanded ICS for Executives training due to the high turnover of senior leaders.

A majority of responders reported receiving feedback on their performance during the response. Providing feedback in IC and operations roles was particularly consistent. Others reported that they did not receive feedback or advice on their roles. Regarding transitions, most responders reported that transition mechanisms such as briefing books, shadowing, informal information exchange, and as-needed requests were utilized.

Training

A majority of respondents reported that they understood their roles/responsibilities well or very well before activation/deployment for the Hurricane Harvey response. However, respondents also reported that additional training in the following topics would have been beneficial to prepare them for their roles:

- REOC roles and responsibilities
- Community involvement or external communications
- ICS training focused on real-world examples or drawn from past responses
- Data management
- Community liaison
- Full hazardous materials (HAZMAT) training
- Group supervisor training
- Finance and resources

Similarly, in their hot wash, Region 6 discussed the need for more training (including refresher training) for KLP positions. The hot wash also addressed the need for KLP personnel to participate in IMT exercises.

N-IMAT Deployment

In the Region 6 hot wash, it was stated that the National Incident Management Assistance Team (N-IMAT) was deployed too soon in the response efforts (requested by the acting Regional Administrator on 8/27 and arrived on 8/29). Their early deployment created logistical challenges (lodging, assigning tasks when needs were not yet known, etc.).

Unified Command

The NDOW Hurricane Harvey hot wash recognized coordination between EPA regional staff and NDOW agencies that formed UC as a success. One shortcoming was the co-location of Incident Command Post (ICP) with UC. Due to the lack of locations to set up the Alpha Branch in the Corpus Christi geographical area, Incident Command (IC) was co-located with the Alpha Branch. This resulted in a lack of adequate work and meeting space. To avoid confusion, there should be adequate space for the IMT.

Scientific Support Coordinator

In the CMAD hot wash, a best management practice identified for Region 6 was the utilization of a Scientific Support Coordinator (SSC). The SSC role was guiding and crucial, and provided continuity to ensure successful handover of the ENVL. In Region 6, the position was filled but not officially recognized on the ICS organization chart. It appeared to work for Region 6 because the REOC recognized the authority of the person in the role. From the CMAD hot wash, there was a recommendation for the SSC position to be officially activated during large responses. Additionally, CMAD found it key that the person serving as the SSC be someone local who is experienced and can serve in the position throughout the response, and not have to rotate.

REOC Operations

EPA staff working in the REOC reported that the process for recruiting, deploying, and obtaining assistance from other regions went very well. It was expressed that this success was due to communication with the backup region (Region 7) and PRL, which allowed the region to keep others informed of their resource needs. REOC personnel also reported that the activation process went well.

Communication

The Regional Incident Coordinator (RIC)/Deputy Regional Incident Coordinator participated in routine calls with the EOC and others. Region 7, however, also reported that the flow of information and plans changed constantly during the response, causing frustration. The Region 6 Acting Regional Administrator (RA) requested additional Region 7 staff to deploy but the field staff did not believe that they needed them and were unsure what duties they should perform.

Field Operations

The TCEQ After-Action Review Report discussed TCEQ and EPA hazardous materials response activities. EPA and TCEQ worked on hazardous material response and assessment activities in addition to orphan container evaluation and recovery. Activities included:

- Conducting response to threatened or actual releases or discharges of hazardous materials
- Conducting assessments to locate hazardous material orphan drums and containers displaced by the storm
- Deploying emergency response contractors to characterize, remove, and stage for disposal orphan drums and containers, and their contents
- Completing hazard material orphan drum and container recovery and disposal operations

EPA and TCEQ also worked jointly to assess Superfund Sites. TCEQ completed assessments at all state Superfund Sites (17) in the affected area, and EPA completed site assessments at all federal Superfund Sites (34). All state sites were cleared, and 33 of the 34 federal sites were cleared. The remaining site required additional follow-up.

A majority of survey respondents reported that field decisions went through the proper chain of command in the field all or most of the time. Additionally, respondents reported that documentation of field decisions was discussed during transitions all or most of the time. Feedback indicated that field operations were closed out, with an example being the TAGA Analytic Final Report.

Feedback from Region 6 indicates that the regional water program and remedial program worked in parallel to the response, and that they need to be better integrated into the response (UC) structure.

ESF-10 Operations

The region conducted hazardous materials operations under ESF-10 for four weeks. USCG conducted vessel recovery operations and provided EPA a Pollution Removal Funding Authorization to keep the ICP running for an additional month.

The NDOW Hurricane Harvey hot wash addressed the successes and challenges of EPA and USCG MAs. One strength of having separate EPA and USCG MAs for ESF-10 was that it allowed the process to be

streamlined and efficient, and cost tracking became easier. Additionally, operations were not hindered by having separate MAs. Separate EPA and USCG mission assignments, however, caused some delay in processing Texas's request due to the initial petition for a 0% cost share.

ESF-13 Operations

Criminal Investigation Division

Under the authority of an ESF-13, or the Public Safety & Security Annex, 25 CID agents were deployed for direct federal assistance. CID agents supported first responders in providing public safety and security. The CID ESF-13 After-Action Report commented on aspects of command and control, logistics, communications, and staffing. Leadership was identified as one of the strengths in the CID report. The deployment of supervisors with agents proved effective and efficient, as well as decision-making by deployed personnel and senior HQ management. This promoted timely adjustments and positive mission outcomes. Information flow was enhanced by having one senior non-deployed Point of Contact (POC) for the leadership of the deployed team to communicate with. Additionally, CID reported that an appropriate number of deployed and non-deployed personnel were available in their respective roles. One of the areas for improvement recognized by CID was that due to low staffing levels, the level of CID's coordination infrastructure was stretched. As a result, it is suggested that the Office of Criminal Enforcement, Forensics and Training (OCEFT) consider steps to increase core ESF-13 staff and augmentation personnel to improve its disaster response.

Several operational strengths and areas for improvement were identified in the CID ESF-13 After-Action Report. They include:

- Command and control
- Logistics
- Communications
- Staffing

National Assets

National assets were highlighted in meetings and hot washes for their usefulness in response efforts. Particularly, the TAGA and ASPECT for the Arkema plant response, and PHILIS for sampling the NPL sites. Region 6 management noted that the N-IMAT was activated quickly and was used operationally, not just as coaches. The Region 6 hot wash also recognized the N-IMAT PIO and FSC as valuable resources in this response. In the Hurricane Harvey hot wash, NDOW cited as an area of improvement the need to carefully plan for the mobilization of assets, and only when requested. This would allow funds to be used for other mission critical tasks.

PHILIS

PHILIS was integrated later in the response because commercial laboratories were being utilized through START contracts. PHILIS was not integrated into UC/IC and it was unclear who was running PHILIS and/or had decision-making authority. Data quality objectives were not consistently developed for PHILIS monitoring.

ASPECT

ASPECT aircraft were used to conduct real-time sampling of potential emissions targets over impacted facilities.

TAGA

The TAGA was used for air quality analysis in neighborhoods surrounding the impacted facilities. In the ERT AAR Survey, Harvey responders reported limitations with powering the TAGA mobile laboratories in Region 6. They required security and power when not monitoring, and generators were not available for use outside the Houston area once monitoring operations were complete. Feedback revealed that that given the limitations, these resources were only available because the Houston laboratory allowed use of their facility.

Interagency Coordination/Tasking

Region 6 felt that their response to Harvey was one of their best responses for several factors, including incorporating lessons learned from the Gold King Mine. Their relationships with the state agencies in Texas have improved due to recent successful responses and because they have good working relationships.

NDOW

Harvey responders noted NDOW coordination with Region 6 as a model for disaster response preparation. They commented on the well-established relationship between EPA and state and federal partners through NDOW, and joint trainings and exercises prepared the UC to work cohesively during the Harvey response. Similarly, in the Region 6 hot wash, the utilization of NDOW products and principles was recognized as very effective and efficient.

State of Texas

The NDOW hot wash, senior manager interviews, and feedback from responders revealed that that coordination with Texas, and particularly with TCEQ, was strong. EPA provided support to TCEQ for drinking water and wastewater system assessments, and EPA's support enabled the prompt assessment of facilities. TCEQ, in their Hurricane Harvey After-Action Review Report, identified as a strength the designation of an EPA staff member to assist TCEQ in obtaining federal assets and support.

USCG

In the NDOW Hurricane Harvey hot wash, it was reported that Captain of the Ports (COTPs) were kept informed during the response. Since multiple COTP zones were impacted, the use of separate Federal On-Scene Coordinators (FOSCs) for ESF-10 allowed COTP zones to focus on other operations (law enforcement, Search and Rescue, etc.).

In the Harvey hot wash, Region 6 discussed that there were jurisdictional issues that arose during the response, much of which involved confusion regarding tasking between EPA and USCG. In the first week of the response, there was an agreement that inland spills would be addressed by EPA and coastal oil spills would be addressed by USCG. This decision was changed a few weeks into the response, assigning responsibility to whoever had the closest assets. This blurred jurisdictional lines, which different groups having different understandings.

FEMA

The MA process with Region 6 was successful. FEMA issued one MA to EPA and one to USCG. At the 2017 NIT meeting, it was reported that the region was able to establish a good working relationship with FEMA. Furthermore, at the 2017 GWPC Conference, a discussion highlighted that interagency

coordination among FEMA, USACE, and EPA successfully facilitated the return to service of the Beaumont water treatment plant after inundation and a pump failure.

Infrastructure Systems

EPA provided support to the TCEQ for drinking water and wastewater system assessments. There were 10 EPA personnel at the TCEQ Austin phone bank, including one individual assisting with data flow and technical regulatory questions. In addition, drinking water and wastewater assessment teams were established in Houston. At peak, 14 EPA personnel conducted drinking water and wastewater assessments in the Houston Branch and 2 EPA personnel conducted drinking water and wastewater assessments in the Port Arthur/Beaumont Branch. EPA Region 6 assessed in total 1,190 wastewater systems and 2,022 community drinking water systems. Several Water Team members reported having difficulty contacting water and wastewater utility operators. Some operators were contacted multiple times without response.

Operations Strengths and Areas for Improvement

Strengths

- Training prepared responders so that they understand their roles and responsibilities before being activated/deployed. Most responders also received feedback about how they were performing in their roles/duties throughout their activation or deployment.
- Overall coordination between EPA regional staff and UC was smooth and effective.
- The role of the SSC was guiding and crucial to the response.
- The process for recruiting, deploying, and obtaining assistance from other regions went very well.
- Separate EPA and USCG MAs worked efficiently.
- CID leadership and decision-making were effective and efficient.
- Use of national assets was helpful in the response, particularly by providing timely data.
- Coordination was effective and efficient among EPA, FEMA, and state partners. NDOW played a significant role in coordinating a smooth response effort.
- UC facilitation with the USCG COTPs went well.
- EPA support to TCEQ enabled the assessment of facilities to be done much more quickly.

Areas for Improvement

- Communication from regional senior leaders, the REOC, and the field was inconsistent. This led to the N-IMAT being deployed prematurely.
 - **Recommendation:** Regional senior leaders and REOC need to better coordinate on needs when requesting assets or additional support from other regions. The Regional IC should also be involved in the decision on when to mobilize the N-IMAT.
- Regional water program and the remedial program worked in parallel to the response.

- **Recommendation:** Provide ICS training for the Water Team and remedial programs, and include the Water Team in annual IMT exercises.
- **Recommendation:** The remedial program needs to develop a disaster preparedness plan for NPL site assessments.
- Tasking under the MAs was unclear between EPA and USCG.
 - **Recommendation:** The issue of authority should be addressed at a national level.
 - **Recommendation:** Issues/decisions should be documented during the response and all agreements should be in writing.

Data Management

This section presents an analysis of data management capabilities related to the Hurricane Harvey response, including data collection, reporting, querying, and sharing, as well as related data management tools.

Data Collection

The NDOW hot wash identified inconsistencies with data collection methods. Standardized methods were not employed for collecting GPS coordinates, and this was coupled with inconsistencies in data recording (done either via iPad or on paper). Responders experienced difficulties uploading and viewing photographs, and reported not being able to see vessel evaluations in the system. Participating states within NDOW made several recommendations regarding changes to the data management tool that was utilized.

Data Reporting

The NDOW hot wash recognized that there was a lack of agreement within UC on what data to report. This included a lack of consensus on data reporting parameters, what data were being reported, and why certain measures were being reported.

During the Harvey response, EPA did not release preliminary data or press releases about its activities early in the response, which could have provided objective information on the environmental conditions of impacted communities. Instead, EPA was more reactive than proactive in responding to press inquiries about the conditions of the Superfund NPL Sites.

Data Querying

Challenges with data querying throughout the response were reported by NDOW. Multiple people were given access to run reports of data and there was no standard process for running queries in the EOC. Consequently, people ran queries differently and pulled different numbers. For example, state drinking and wastewater data were different than EPA's data due to the time of the pull. Data queries were also occasionally done without proper quality control. Standard queries should be available. Regions should have a designated point of contact using standardized queries to report data. Other response partners at the federal, state, or local level should designate a point of contact for data management and be familiar with standardized queries to report data.

Response Manager

Region 6 uses a data management tool called Response Manager that was developed for them by their START contractor. Region 6 has trained all of the NDOW partners in use of Response Manager during natural disaster responses. In general, NDOW recognized the use of Response Manager as an improvement for water infrastructure assessments over previous responses. However, several improvements were identified that need to be made. For one, methods were inadequate for tracking boil water notices for every assessment, which could cause mistakes in the boil water notice data. Additionally, the status of assessments changed colors based on previous assessments, leaving the possibility for misleading interpretations.

TCEQ, in their After-Action Report, identified several procedural and software issues related to the water and wastewater module of Response Manager.

Data Sharing

A majority of survey respondents reported that Region 6 communicated and shared information well with supporting regions. Respondents also indicated that Region 6 communicated and shared information well with program office representatives. In hot washes, and through responder feedback, several instances of inconsistent communication were noted. Examples include mixed messaging regarding data reporting parameters and timekeeping/pay. It was also reported that information exchange between regional/field components and HQ/National Response Coordination Center was difficult to synchronize.

Data Management Strengths and Areas for Improvement

Strengths

- Region 6 communicated and shared information well with supporting regions and program office representatives.
- Use of the Response Manager tool was an improvement for water infrastructure assessments compared to previous responses.

Areas for Improvement

- Methods were inadequate and misleading for tracking boil water notices.
 - **Recommendation:** The Agency should develop a more effective process for developing and tracking boil water notices.
 - **Recommendation:** A new protocol should be established for tracking the status of assessments.
- Conflicting information was communicated from different sources within the Agency.
 - **Recommendation:** ENVL and PIOs need to coordinate to improve messaging regarding data.**

** This recommendation is consistent with recommendations from the annual EPA Response Readiness Evaluation Program and is being addressed by the Agency.

Incident-Specific Strengths and Areas of Improvement

The following table summarizes the main strengths of the Hurricane Harvey response.

Capability	Strengths
Planning	ESF-10 pre-deployment was well-coordinated between state and federal agencies
	Staff felt that their length of deployment was appropriate
Logistics	The ability to obtain trailers through the logistics contract provided flexibility
Health and Safety	Increased requests for EPA vaccinations/screenings were manageable
	Responders received site safety briefings and received adequate field safety training prior to deployment
	Safety supplies were adequate
Operations	Responders understood their roles and responsibilities
	Coordination was smooth between Agency staff and UC
	The role of the SSC was guiding and crucial to the response
	CID leadership and decision-making was effective and efficient
	National assets were helpful in the response by providing timely data
	Separate EPA and USCG MAs worked efficiently
	NDOW played a significant and effective role in coordinating the response effort
	Coordination among EPA, the State of Texas, and FEMA was strong
Data Management	Appropriate information sharing among regions and program office representatives
	The use of Response Manager improved

The following table summarizes the main areas for improvement of the Hurricane Harvey response with associated recommendations.

Capability	Areas for Improvement and Recommendations
Planning	Simplify mobilization and demobilization plans, and develop templates
	Provide additional training or webinars on various roles or responsibilities
Public Info	Develop messaging templates to address communicating data to the public
	Coordinate with state and local agencies on community outreach needs and develop trainings/briefings for CLs on their roles
	Consider integrating environmental justice into the CCP
	Ensure that deployed staff coordinate with regional staff who hold a GPO Express Purchase Card
	Translation services and materials should be prepared and their availability ensured early in the response
	Proactively issue press releases to the public on response activities and accomplishments**
Logistics	The Agency should review the process for monitoring available contract capacity at the regional and HQ levels
	Consider process improvements to improve adherence to the ICS process**
Finance	More personnel support is needed for finance
	Develop an electronic platform to sign-in/out during large responses

Operations	Regional IC should be involved in the decision to mobilize the N-IMAT
	Provide ICS training for the Water Team and remedial programs**
	Tasking issues between EPA and USCG should be addressed at the national level
Data	Develop an effective process for developing and tracking boil water notices
Management	ENVL and PIOs need to coordinate to improve messaging regarding data**
** This recommendation is being addressed by the Agency.	

APPENDIX D: OVERVIEW AND ANALYSIS OF HURRICANE IRMA AND MARIA RESPONSES

Incident Overview

For the purposes of this report, responses to Hurricanes Irma and Maria are evaluated together because they impacted similar areas over a short period of time.

Hurricane Irma

Hurricane Irma began to impact Puerto Rico and the U.S. Virgin Islands (USVI), part of EPA Region 2, on September 5, 2017, then made landfall in Monroe County, Florida, on September 10, 2017, as a major Category 4 hurricane. Immediately following the storm, Region 2 had about 70 personnel involved in the initial hurricane efforts, and assessment teams were deployed to Puerto Rico and the USVI to conduct operations. EPA deployed OSCs to St. Croix to conduct debris assessment within the USVI, as well as to USVI and Puerto Rico to conduct damage assessments. Region 4 had approximately 44 personnel involved in emergency response efforts immediately following the storm, and 7 people were deployed to Florida. EPA maintained communication with the State of Georgia to determine if an EPA representative was needed at the ESF-10 Desk in the State Emergency Operations Center (SEOC) in Atlanta.

Following the storm, EPA Region 4 communicated with the RMP and the FRP bulk oil facilities to first identify any vulnerabilities and then ensure they were secure. EPA Region 4 completed a rapid assessment of all 90 remedial sites within the State of Florida. They also prepared a Site-Specific Data Management Plan (DMP) for the incident. EPA Region 2 assessed 23 Superfund and oil sites in Puerto Rico and the USVI to evaluate their vulnerabilities prior to Hurricane Irma making landfall, and conducted post-hurricane assessments. EPA teams focused on immediate threats from hazardous substance releases and oil spills, orphan hazardous containers, HHW, contaminated debris, and drinking water/wastewater issues.

Hurricane Maria

On September 20, 2017, Hurricane Maria struck the USVI as a Category 5 storm and then Puerto Rico as a Category 4, just two weeks after Hurricane Irma struck the Caribbean islands. The storms severely damaged power distribution, drinking water and wastewater treatment plants, and other buildings and infrastructure.

EPA was tasked with MAs based on requests by territorial and Commonwealth governments of the USVI and Puerto Rico to FEMA as part of the National Response Framework. EPA's response was managed through the EPA Region 2 REOC in Edison, New Jersey, with Incident Commanders in Puerto Rico and the USVI directing various teams on-the-ground.

Prior to the hurricanes striking Puerto Rico and the USVI, EPA identified the high-priority sites that would require assessment after the storms. These sites included 35 Superfund Sites listed on the NPL, cleanup sites not on the NPL but needing federal action, active oil spill cleanup sites, and active removal

sites. EPA teams also worked with the Commonwealth and territorial governments in assessing and sampling drinking water and wastewater systems, with the goal of identifying and reporting malfunctioning/missing components and immediate needs to be addressed by the appropriate agencies. EPA also handled all hazardous components found in the waste streams.

This section includes a brief overview of the incident, a summary of personnel and resources provided by the Agency, and an analysis of core capabilities relating to this specific incident.

EPA Management Objectives

1. Ensure that the health and safety of the EPA responders are considered at all times.
2. Establish an incident management structure and processes employing the IC System to enable effective overall management of the event with deployment of resources (staff and equipment) in a rapid, aggressive, and well-coordinated manner.
3. Ensure prompt review and processing of Fuel Waiver requests.
4. Prepare for and provide rapid assessment of industrial facilities as requested by the state or under EPA's statutory program responsibilities for CERCLA Superfund, RMP, and FRP facilities. Working with our state partners, contact industrial sources within the impacted area to determine their operational status and determine what support can be provided with monitoring the start-up of industrial sources.
5. Prepare for and provide rapid assessment and technical assistance drinking water and wastewater facilities as requested by the state or local government. EPA will support our state partners in contacting drinking water and wastewater systems.
6. Prepare a Sustained Response Plan that outlines the resource and equipment needs for a long-duration response.
7. Activate the Agency's CCP to ensure effective and efficient coordination of all incident communications.
8. Encourage a collaborative federalism approach, where national, state, and local governments interact cooperatively and collectively to solve common problems.
9. Begin Agency internal and external coordination, under the National Disaster Recovery Framework, regarding RSFs in which EPA is likely to be involved.

Summary of Personnel and Resources

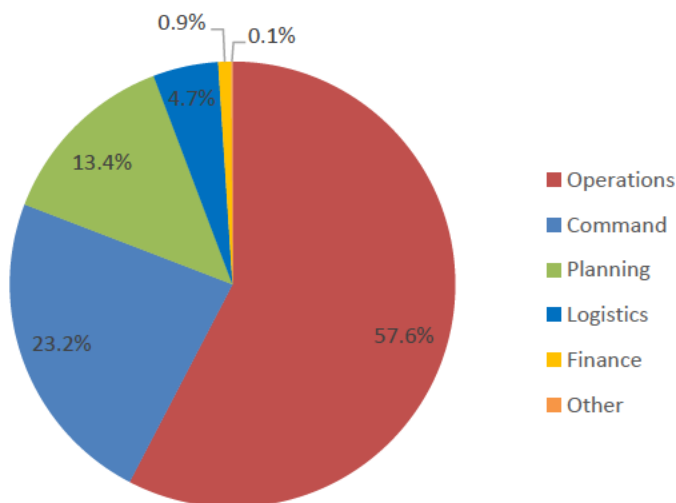
The EPA response in Region 2 lasted from September 4, 2017 to September 15, 2018 (376 days). The response in Region 4 lasted from September 1, 2017 to December 12, 2017 (91 days). As shown in Exhibit 7, 725 EPA staff were deployed from HQ and the regions to support the Irma/Maria response. Of these 725 staff, 157 were OSCs, 349 were RSC members, and 219 were non-RSC members. A total of 134 HQ staff were deployed, including 30 from the National Criminal Enforcement Response Team (NCERT), 26 from ERT, 9 from the Radiological Emergency Response Team (RERT), and 8 from CMAD.

Exhibit 7. Number of Individuals Deployed for Hurricanes Irma and Maria by Region/Office

Home Region	Number of Individuals
HQ	134
1	61
2	170
3	88
4	80
5	106
6	24
7	29
8	7
9	10
10	16
Total	725

Source: 2017 ER Resources Qlik Application

The 725 staff completed 1,164 deployments. While most individuals were only deployed once, 152 were deployed twice, and 102 were deployed 3 or more times. There were 1,098 deployments to Region 2, and 66 to Region 4. Exhibit 8 summarized the roles served in the 1,164 deployments by ICS section.

Exhibit 8. Roles Served in Individual Deployments for Hurricanes Irma/Maria

Source: 2017 ER Resources Qlik Application

Analysis of Core Capabilities

Planning

This section presents an analysis of planning capabilities related to the Hurricane Irma and Maria responses, including personnel deployment and incident action plans (IAPs).

Personnel Deployment

Most responders received deployment packages that included information about accounting, lodging, equipment requirements, check-in/out procedures, People Plus charging information, and demobilization information. Several responders in both Regions 2 and 4 reported not receiving a deployment package. Some responders who received a package reported that it did not provide sufficient information on expectations, roles, logistics, etc. Some stated that packages were not timely or contained inaccurate and/or outdated information. In Region 4, some packages did not contain lodging and demobilization information. Responders suggested the following information be included in deployment packages, particularly for the staff deployed for the Region 2 response:

- Current information on expectations of role and a list of anticipated activities
- Information about who to report to upon mobilization
- Guidance on cultural attitudes in communication
- Clarity on types of vehicles to rent
- Guidance on payroll procedures
- Information on whether or not personnel will be deployed to the ICP of or field to ensure appropriate vehicle type and number

Feedback from the ERT AAR Survey indicated that the mobilization plan was too long, and that many responders in Puerto Rico did not read the documentation.

Mobilization and demobilization of personnel was noted as problematic in the ERT AAR Survey. Many of the responding personnel were reported as being uncertain about making travel arrangements, including interfacing with Logistics at the REOC for lodging. Many responders “ignored” interfacing with Logistics, causing problems with lodging.

Incident Action Plan

Feedback from a number of sources indicated that IAPs were either not prepared, not made apparent, or were delayed. Staff reported that Region 2 did not have a real IAP, that there was a need for IAP and 204 forms to be completed, and that an IAP was introduced late into the response.

Planning Strengths and Areas for Improvement

Strengths

- Refer to the main report for relevant strengths.

Areas for Improvement

- Refer to the main report for relevant areas for improvement.

Public Information

This section presents an analysis of public information capabilities related to the Hurricane Irma and Maria responses, including the CCP, CIC/PIO coordination, outreach materials, translation/language needs, and press inquiries.

Crisis Communication Plan

EPA has a CCP that establishes the Agency's process for communicating environmental information to the public; and coordinating public information among the Agency's field operations, regional offices, and HQ during a response. It establishes roles and responsibilities to effectively integrate the Agency's public affairs, emergency management, and interagency communication activities during an emergency response to ensure that public dissemination of information about a response is understandable, timely, accurate, and consistent.

Region 2 responders had varying opinions of how well the CCP was implemented. A number of responders reported that they were not aware of the CCP or that it was not actualized during the response, which may explain the mixed feedback. Notably, OPA commented that it was the regions, not HQ, which activated the CCP.

Region 4 reported that their test of the CCP was a success, which involved deployment of a PIO from HQ.

CIC/PIO Coordination

A majority of responders in Region 2 reported that regional PIOs and CICs coordinated well. Coordination was successfully achieved through regular emails, phone calls, and occasional in-person visits. Daily reports were required of CICs by PIOs, which facilitated this coordination. Several responders, however, indicated that more communication from the PIOs to the CICs was needed in the field. A majority of responders also felt that the PIO leadership cadre met with appropriate frequency.

Outreach Materials

Responders noted delays in working with HQ OPA. Because decisions were all routed through HQ, approval of outreach materials and public messaging was not always approved in time to address field needs. The editing and approval process required several iterations. The process would take about a week, which was inadequate for information that needed to be distributed to the public immediately. In St. Croix, an agreement was worked out to allow immediate distribution if the only change made to the documents were to the date, time, and/or location. This was not the case in Puerto Rico, where outreach materials had to go through the entire approval processes for every distribution. Additionally, many responders also reported challenges getting the factsheets printed.

Senior managers identified a need for improvements in the story map process to quicken regions' abilities to produce them in a timely manner. The emergency response/removal program continues to develop technology to link in source information so that the story map updates periodically without direct interaction.

Translation/Language Needs

Translation

In their Lessons Learned document, Region 7 recognized success with the timeliness of translations in Region 2. With support from HQ, translations were occurring within two hours. Furthermore, success was noted with having a translation contract task order in place for the responses.

Personnel Language Abilities

At the February 2017 RM face-to-face meeting in Denver, it was noted that there were limited EPA personnel with Spanish language ability. Additionally, a majority of Region 2 responders reported that Spanish language skills would have been useful for CICs if they were not fluent. In an interview, however, an incident was discussed where one Region 6 staff member, a Spanish-speaking individual from Puerto Rico with a drinking water/wastewater background, was not allowed to deploy to Puerto Rico. Instead, the individual was assigned to deploy to Region 9 because Region 6 had been designated to assist Region 9. This responder did not have the necessary skill sets for the wildfire response, yet did for the Irma/Maria response. This raised concerns that personnel deployments were not sensitive of particular skill sets and cultural backgrounds to maximize the impact of personnel in responses.

Press Inquiries

A majority of responders in both regions reported that details in press releases were vetted all or most of the time. EPA Region 2 press releases distinguished between EPA Region 2 and CEPD, which created the perception that CEPD was a Puerto Rican agency rather than an EPA division within Region 2.

Public Information Strengths and Areas for Improvement

Strengths

- The deployment of a PIO from HQ was a success for Region 4.
- Coordination between CICs and PIOs was sufficient.
- Translations occurred in a timely manner and a translation contract task order was in place.

Areas for Improvement

- Personnel language skills and cultural backgrounds were not always taken into consideration when assigning deployments.
 - **Recommendation:** Regions should review skill sets identified in the PRL.

Logistics

This section presents an analysis of logistics capabilities related to the Hurricane Irma and Maria responses, including lodging, resources, and the LSC position.

Lodging

Responders from both regions reported that hotels rooms were the primary source of lodging, and that trailers were not used. Responders felt that the use of hotel rooms was efficient and effective, given the nature of the response.

Region 2

The Region 2 Lessons Learned Work Plan identified lodging as a challenge in the response. Making room reservations was difficult since purchase cards were needed. With the lack of hotel space, the process was also difficult to manage. EPA had to compete with other agencies for lodging space.

Resources

Region 2

According to senior leaders, personnel and equipment were significantly delayed in being deployed to the islands. At their Denver meeting, RMs discussed specific challenges, including inadequate cell phone coverage, lodging, driving conditions, availability of rental cars, limited equipment on the islands, and shipping and customs delays.

Responders reported that the region used 213 forms for ordering resources, which were tracked via hard copy and electronically. At the NIT meeting, it was discussed that there was confusion with purchasing equipment using Stafford Act funding. The lack of understanding of equipment ownership and final disposition delayed this process. Additionally, Region 2 identified that tracking of deployed equipment was an issue once personnel started to be rotated in and out of the response. Responders reported that tracking of non-personnel assets occurred through WebEOC, SharePoint, Excel, and/or Word Documents. To avoid such issues, detailed transition mechanisms should be developed to ensure that equipment is tracked properly in Sunflower.

In the EPA Hurricanes Harvey/Irma/Maria and Wildfire Response Lessons Learned Work Plan, senior managers noted that Region 2 quickly used the available contract capacity for both the ERRs and START contracts. This led to difficulties with placing additional funding on the contracts to continue work.

Feedback from the ERT indicated that an onsite LSC was not available at the start of the response, which would have been beneficial.

Region 4

In Region 4, responders also reported that 213 forms were used for ordering resources. Responders mostly felt that the process worked well. The tracking of 213 forms was also done through electronic and hard copy means.

Logistics Strengths and Areas for Improvement

Areas for Improvement

- Region 2 quickly used the available contract capacity for both ERRS and START contracts, and struggled to place additional funding on the contracts.
 - **Recommendation:** The Agency should review the process for monitoring available contract capacity at the regional and HQ levels.

Finance

This section presents an analysis of finance capabilities related to the Hurricane Irma and Maria responses, including financial management, time reporting, and pay.

Financial Management

The Region 2 Lessons Learned Work Plan discussed how People Plus does not allow the host region to access People Plus users outside of their region. This prohibited efficient tracking of charges to specific MAs for salary and premium pay. Additionally, quick adjustments could not be made as MAs were modified.

The Region 2 Work Plan and responder feedback also revealed challenges with purchase cards. Only Region 2 personnel with purchase cards were allowed to make micro-purchases, putting burden on the response to find Region 2 personnel with this capability. Responders also reported that purchase card monthly limits were not adequate.

In the Region 4 hot wash, challenges were described with tracking costs not associated with MAs, such as NPL costs. Consequently, the region cited the need for better accounting mechanisms to track non-MA costs.

Time Reporting and Pay

Timekeeping and Reporting Procedures

In both Regions 2 and 4, many responders did not feel that they were adequately briefed on timekeeping and charging procedures prior to or after their deployments. In both regions, responders employed a mix of formal and informal mechanisms to keep track of time daily. A majority of responders utilized formal sign-in/sign-out sheets to track their time. However, additional informal methods such as email, text messages, and tracking in personal notebooks and in Excel were heavily used. Responders reported various issues with People Plus, primarily challenges with connectivity (Region 2) and lack of accounting codes (Regions 2 and 4).

Pay Cap Waivers

Many responders, primarily in Region 2, experienced issues with pay cap waivers. Issues primarily involved delayed processing and issuing of waivers, delayed or incorrect payments, and missing overtime payments. Responders also reported a lack of support in dealing with these issues. In both regions, a majority of responders expressed the need for consistency in the pay cap waiver process. Similar concerns regarding overtime and compensatory time were expressed in the 2017–2018 disaster hot wash.

Finance Strengths and Areas for Improvement

Areas for Improvement

- Regions did not have access to People Plus users outside of the host regions.
 - **Recommendation:** Coordinate with OCFO to provide the regions access to other People Plus users outside of the host region.

- Purchase cards in Region 2 were limited by spending cap and to certain personnel.
 - **Recommendation:** Logistics personnel in the field need to have access to a purchase card. Additionally, OSCs assisting the response from other regions should be allowed to use their purchase cards.

Health and Safety

This section presents an analysis of health and safety capabilities related to the Hurricane Irma and Maria responses, including safety briefings, PPE and safety supplies, safety requirements and training, and occupational injury/illness and risk.

Safety Briefings

A majority of responders in both regions reported that they received an initial site safety briefing and daily briefings upon arrival to the impacted region. Physical risks, chemical/HAZMAT risks, biological risks, and potential injury were all covered in daily safety briefings for most responders.

PPE and Safety Supplies

Most responders in both regions had proper PPE for the positions they served. For responders in Region 2, PPE was mostly provided by responders' home/supporting regions, while PPE for responders in Region 4 was contributed more evenly by both the impacted region and the home/supporting regions.

Several responders in Region 2 reported that they encountered some safety supply shortages, including first aid kits, gloves, bottled water, hard hats, safety vests, work boots, emergency response shirts, tire repair products, and water bottles.

Safety Requirements and Training

In both regions, most responders felt that their level of field safety training was adequate for the work they performed. Several responders, however commented that additional safety training that covered the following topics would have been useful:

- Position-specific safety
- Working around heavy equipment
- Transportation and disposal, and chemical storage/compatibility
- Exercises to simulate field conditions
- Driving hazards

Health and Safety Plans

The Region 2 Hurricane Irma-Maria Lessons Learned Work Plan discussed that the Health and Safety Plan (HASP) needed updates and adjustments throughout the response and they were slow to occur. The region identified this as a high-priority issue.

Occupational Injury/Illness and Risk

Several responders in Region 2 reported experiencing occupational injury or illness while activated or deployed. However, responders did not report all incidents or promptly, and properly address these incidents with medical treatment.

In both regions, but more prominently in Region 2, responders reported encountering issues while driving. Road conditions in Regions 2 and 4 were very hazardous, resulting in issues such as flat tires and broken shocks. In Region 2, rental vehicles were limited and responders were equipped with vehicles that were too small or not suitable for the road conditions.

Health and Safety Strengths and Areas for Improvement

Strengths

- Most responders had proper PPE for the positions they served.
- Most responders felt that their level of field safety training was adequate for the work they performed.

Areas for Improvement

- None noted.

Operations

This section presents an analysis of operations capabilities related to the Hurricane Irma and Maria responses, including ICS implementation, field operations, REOC operations, use of National Assets, and ESF-10/interagency coordination.

ICS Implementation

ICS Structure

Region 2 noted that coordination was as a particular strength. They used the N-IMAT effectively and had full engagement at all levels of leadership (senior managers through the Incident Commander). Feedback from Region 2 responders indicated that the ICS process was not fully implemented and a “hybrid” ICS model was used. Comments expressed that some staff lacked knowledge of the ICS process, and employed their own versions of ICS. In the Region 2 Hurricane Lessons Learned Work Plan and the NIT meeting, it was noted that many responders in the Caribbean region were unfamiliar with ICS principles, including personnel at EPA’s CEPD. This presented a challenge when Region 3 tried to implement ICS, and in addition no one in CEPD was KLP-trained. It also was not initially clear whether Region 2 or CEPD was leading various missions.

Notes from the February 2017 RM meeting in Denver and additional responder feedback discussed the need for additional EPA personnel to receive ICS training, including RSCs and OSCs. Responders also indicated that adherence to the ICS structure was difficult for this response because CEPD staff were less familiar with ICS and because Region 2 assigned multiple Incident Commanders and ran the response out of the REOC. ERT responders further reported in the ERT AAR Survey that communication was a challenge between the islands and the command center. Coordination was a challenge with two

overarching control offices, and REOC and the field was disconnected. The line of command was unclear and the information flow was occasionally slow from the REOC to the field.

At the NIT meeting, it was discussed that tension arose between EPA's CEPD and Edison staff. Tension between the two formed for several reasons:

- The ICP was established in the CEPD office and some CEPD personnel felt overtaken by response-deployed personnel.
- CEPD was in Continuity of Operations Plan mode during the early phase of the response. However, responding personnel were still being personally impacted by the incident while managing the response.
- CEPD initiated early operations but were not fully integrated early on in the response structure.

Training

Most responders in Regions 2 and 4 expressed that their training prepared them well for the responsibilities, duties, and situations they encountered in the roles they served. A majority of the responders also reported that they understood their roles and responsibilities well or very well before activation/deployment for the Irma/Maria response. However, respondents also indicated that some additional training would have been beneficial to prepare them for their roles.

Staff deployed to Region 2 reported the following training gaps:

- ICS training
- Refresher small rural water systems sanitary survey training
- KLP training (including for LSC, Resources, SITL, RESL, ENVL)
- CIC/PIO training
- WebEOC training (for RESLs)
- Primer on science behind the response – clean water and water testing
- Water Desk within the ICS structure
- Consequence management
- Root cause analysis
- Advanced incident commander (USCG ICS-410)
- USCG operations

Staff deployed to Region 4 reported the following training gaps:

- Vessel recovery
- Information on watercraft safety related to watercraft extraction
- FEMA's finance and MA process

A majority of the responders in both regions reported receiving feedback throughout their activation/deployment. Transition mechanisms were also used among personnel in both regions,

although this has been identified as an area for improvement. Shadowing, as-needed requests for information, and informal information from outgoing staff were the primary transition mechanisms. Responders also used mechanisms such as briefing books, SharePoint, emails, and emails for facilitating transitions. However, in their hot wash, Region 3 discussed the need for Region 2 to develop transition guidelines. The lack of an effective transition system resulted in inefficiencies and miscommunication.

Scientific Support Coordinator

Feedback was received that the Environmental Unit (EU) was not represented initially in the command meetings in Region 2. This caused difficulties with writing of planning documents, as PSCs were not focused on scientific issues. This lack of planning led to sampling activities being undirected for decisions, delaying the mission. There was a need to officially activate the position to give it the credence and authority needed for the position to be effective. It was determined that activating the SSC was a best practice to prevent issues from occurring. With the position of SSC filled, the EU was able to better anticipate sampling events and be better prepared when the mission went to operations. There were no delays, as science issues were resolved prior to deployment of sampling teams. Specific information to be collected and analyzed was all prepared to be distributed with the specific decisions clearly explained.

Field Operations

Field operations for Irma/Maria included the following:

- Vessel assessment and recovery
- HHW collection and debris management
- Oil and chemical spill response
- Wastewater treatment and pump station assessments
- Drinking water sampling
- Ambient air monitoring station repairs
- Restoration of the Environmental Quality Board laboratory
- Off-grid drinking water system operations

Region 2

In the NIT 2017 Lessons Learned meeting, it was reported that Region 2 began conducting fixed facility, NPL, and drinking water assessments in addition to conducting coordination in preparation for operational missions. There was a significant gap of time between the assessment and execution of missions.

Many of the field operations in the islands did not commence until January 2018. This was due to logistical issues and lack of preparedness among the Puerto Rico and USVI governments.

Additionally, staff reported that Region 2 struggled with logistical challenges in Puerto Rico. The Hurricane Maria response was intended to follow the same model as the Hurricane Sandy response, which involved an IC with a light staff, enabling field operations to flow like a removal site would without the overhead of an ICS, which is maintained in the REOC. However, three ICs in Puerto Rico and two in the USVI operated fairly independently, resulting in some coordination and consistency issues.

Region 4

Region 4 established a response structure in the Florida Keys with USCG. Region 2 MAs included ESF-10 facility and orphan container assignments, and ESF-10 orphan container and vessel recovery. The region experienced several challenges with vessel recovery, including health and safety with driving and crane-lifting operations. In addition, it was costly to transport vessels to staging areas. The region purchased boat stands to stage vessels, which ended up creating property management and tracking challenges. A total of 1,275 boat stands were purchased, of which FEMA required each set (2 per set) to be tracked as property. This represented a total of 2,550 trackable items, which were later transferred to FEMA, and then the Florida Fish and Wildlife Conservation Commission (FWC) (who required the use of boat stands for staging vessels). From this experience, the region learned to exercise caution when purchasing items during a FEMA response, as they would need to be returned to FEMA.

OCEFT

EPA's OCEFT deployed multiple teams of NCERT special agents to Puerto Rico and the USVI under the authority of ESF-10, or the Oil & Hazardous Materials Response Annex. The CID developed an After-Action Report regarding ESF-10 operations. Areas addressed in the report include command and control, logistics, communications, staffing, and REOC.

REOC Operations

Region 2

Lessons learned from the NIT 2017 Lessons Learned meeting included discussions of Region 2 REOC functions. The planning, finance, and administration functions were carried out through REOC support during Hurricane Irma. Although the model worked well for that response, it did not carry over well for the response to Hurricane Maria. This was primarily due to the magnitude of the response, logistical issues, and adjustments to the response structure that were slow to develop. As such, regional management will need to consider the most appropriate approach for particular circumstances.

Region 2 forms were posted to SharePoint, which ICP personnel were able to access. This was a major aid for remote REOC support.

National Assets

N-IMAT

Senior leaders considered the use of the N-IMAT very effective in Region 2. N-IMAT was also brought in to the response quickly.

ERT

The ERT was utilized in Regions 2 and 4. Responder feedback indicated that the ERT was very helpful during the response.

ESF-10/Interagency Coordination

Senior manager interviews, NIT lessons learned, and Region 2 and 4 responders identified that there were coordination challenges among EPA, FEMA, and USACE.

Region 2

Several coordination challenges between FEMA and EPA were discussed in the Hurricane Irma-Maria Work Plan, senior manager interviews, responder feedback, and in lessons-learned documents. Multiple responders commented that timeliness was an issue in FEMA's processing of MAs. During the response,

FEMA also questioned the ongoing support of the HQ EOC and REOC funding under the initial MA. A compromise was made to transfer the funding support to an operational MA that would eventually open to a cost share. However, toward the end of the response, FEMA continued to question the support of the EOCs.

Regions 1 and 2 discussed in the NIT meeting that under ESF-3 Public Works and Engineering Annex, FEMA and USACE did not have the resources to address non-utility public drinking water systems. FEMA assigned EPA to assist with infrastructure repairs and power generation issues, however, FEMA was late to issue an MA to EPA. FEMA was also inconsistent on the requirements that allowed a system to be supported under the MA.

Region 4

In Region 4, the FEMA MA process was problematic for EPA. Senior managers reported that FEMA would not amend MAs, and instead created new mission assignments. This created much administrative work for EPA, which ultimately took resources away from the response. Responders in the region also reported that MA, amendments, and extensions were rarely received from FEMA in a timely manner. Discrepancies between the state and FEMA WebEOC systems further complicated matters, as the transfer of MA from state to federal systems led to the loss of critical language in the MAs. Furthermore, FEMA was issuing modified MAs without signoff from states or the federal agency involved.

Responders reported that ESF-10 established its own command post separate from the Joint Field Office (JFO). The lack of an ESF-10 presence may have contributed to FEMA's lack of coordination with EPA on the issuance of modified MAs. State partners also did not maintain a presence at the JFO for ESF-10.

A best practice identified in the Region 4 hot wash was regarding coordination and use of mixed teams between the Agency, the USCG, and the Florida Department of Environmental Protection (FL DEP).

Operations Strengths and Areas for Improvement

Strengths

- Most responders received feedback about how they were performing throughout their activation or deployments.
- For CID, Information flow was enhanced by having one senior non-deployed POC for deployed team leadership to communicate with.
- Use of SharePoint was allowed for remote REOC support.
- The N-IMAT was used quickly and effectively in Region 2.
- Coordination was strong among the EPA, the USCG, and the FL DEP in Region 4.

Areas for Improvement

- Roles and responsibilities between the region and CEPD were not clearly delineated.
 - **Recommendation:** Roles and responsibilities for CEPD staff should be clearly defined for future responses.
- There was a need to officially activate the SSC role.

- **Recommendation:** The SSC role should be officially activated during a large response and be filled by an individual who is local and can serve in the position throughout the response.
- Better coordination regarding OCEFT logistics was needed when participating in IC.
 - **Recommendation:** Supervisors should be ICS trained and represent OCEFT at the REOC..
- Coordination was not sufficient among FEMA, the states, and other federal agencies regarding MAs.
 - **Recommendation:** The Agency should coordinate with FEMA on expectations of HQ EOC and REOC support, on FEMA tasking of EPA to provide drinking and wastewater assistance, and on clarifying inconsistencies with MA issuance.

Data Management

This section presents an analysis of planning capabilities related to the Hurricane Irma and Maria responses, including those related to Region 2 and Region 4.

Region 2

The Region 2 Lessons Learned Work Plan identified data collection as an area of improvement. Region 2 stated the need to refine data collection forms to include information that may be specific to external users or data specifically requested by EPA HQ (e.g., OW data needs).

Region 4

Region 4 identified data management as a success in the Irma response. At a GWPC Conference, it was noted that the region tied in with FL DEP water system status data management systems, which ensured timely and consistent reporting of water system status and impact information. Region 4 responders also reported that a Quality Assurance Project Plan was in place, and that data quality objectives were very well anticipated. Tablets with real-time data capabilities were also utilized, which added to data management success.

Data Management Strengths and Areas for Improvement

Strengths

- Data management between Region 4 and the FL DEP was successful.

Areas for Improvement

- Data collection methods needed to be improved in Region 2.
 - **Recommendation:** The region should hold training on data collection and DMPs, and HQ data needs should be anticipated during DMP development.**

** This recommendation is consistent with recommendations from the annual EPA Response Readiness Evaluation Program and is being addressed by the Agency.

Incident-Specific Strengths and Areas of Improvement

The following table summarizes the main strengths of the Hurricane Irma and Hurricane Maria responses.

Capability	Strengths
Public Information	The deployment of a PIO from HQ was a success for Region 4
	Coordination between CICs and PIOs was sufficient
	Translations were timely and a translation contract task order was in place
Health and Safety	Responders felt that their level of field safety equipment and training was adequate
Operations	Responders received feedback about how they were performing
	For CID, information flow was enhanced by having one senior non-deployed POC
	N-IMAT was used quickly and effectively
	Coordination was strong among the Agency, USCG, and FL DEP in Region 4
Data Management	Data management between Region 4 and FL DEP was successful

The following table summarizes the main areas for improvement of the Hurricane Irma and Hurricane Maria responses with associated recommendations.

Capability	Areas for Improvement and Recommendations
Public Information	Limited EPA personnel with Spanish language ability; consider language needs in staffing
Logistics	Review the process for monitoring available contract capacity at the regional and HQ levels
Finance	Provide regions access to other People Plus users outside of the host region
	Purchase cards should be made available to Logistics personnel in the field
Operations	Roles and responsibilities for CEPD staff should be clearly defined
	There was a need to officially activate the SSC role
	Supervisors should be ICS trained and represent OCEFT at the REOC
	Coordinate with FEMA on support expectations and tasking, and on clarifying inconsistencies with MA issuance
Data Management	Hold training on data collection and DMPs, and anticipate HQ data needs**
** This recommendation is consistent with recommendations from the annual EPA Response Readiness Evaluation Program and is being addressed by the Agency.	

APPENDIX E: OVERVIEW AND ANALYSIS OF CALIFORNIA WILDFIRES RESPONSE

Incident Overview

Fires began burning on October 8, 2017, in multiple counties of Northern California. EPA provided support to FEMA, USACE, and state and local partners in the ongoing joint response to the fires. Initially, FEMA tasked EPA to respond to an oil discharge resulting from a burning collection of abandoned tires in lower Napa County and collect HHW in Napa and Sonoma counties. By mid-November, EPA was tasked with HHW collection and asbestos assessment and removal in Lake and Mendocino counties, and by mid-December with asbestos assessment and removal in Napa and Sonoma counties. In total, EPA conducted HHW collection and asbestos assessment/removal in four affected counties by mid-December.

EPA also led the survey, collection, and disposal of HHW at nearly 7,000 residential and commercial parcels affected by the fires in four counties. This included collection of compressed gas cylinders and ammunition, as well as working on more complex sites such as farms and 12 mobile home communities. Many of these parcels had multiple damaged/destroyed residential and/or other structures. EPA completed removal of HHW at 6,580 fire-affected parcels in Napa and Sonoma counties; and removed asbestos from 712 properties in Napa, Sonoma, Lake, and Mendocino counties.

This section includes a brief overview of the incident, a summary of personnel and resources provided by the Agency, and an analysis of core capabilities relating to this specific incident.

EPA Management Objectives

1. Ensure health and safety of all response personnel and communities
2. Integrate EPA response assets with federal, state, and local response structures
3. Minimize social, governmental, and economic adverse impacts
4. Maintain an incident management structure and processes, consistent with the NIMS and ICS doctrine and principals, to enable effective overall management of the incident
5. Execute the Agency's CCP
6. Provide assessment and cleanup of public and private properties, to render properties safe from hazardous materials and HHW, so that the removal of non-hazardous solid waste, ash, and debris can occur
7. Provide assessment and technical assistance to drinking water and wastewater facilities as requested by the state, Tribal, or local government
8. Encourage a cooperative federalism approach to the incident response, where national, state, and local governments work together to solve common problems

Summary of Personnel and Resources

The EPA response lasted from October 23, 2017 to May 3, 2018 (192 days). As shown in Exhibit 9, 210 EPA staff were deployed from HQ and the regions to support the wildfire response. Of the 210 staff, 56 were OSCs, 140 were RSC members, and 14 were non-RSC members. A total of 12 HQ staff were deployed, including 9 from ERT and 2 from CMAD.

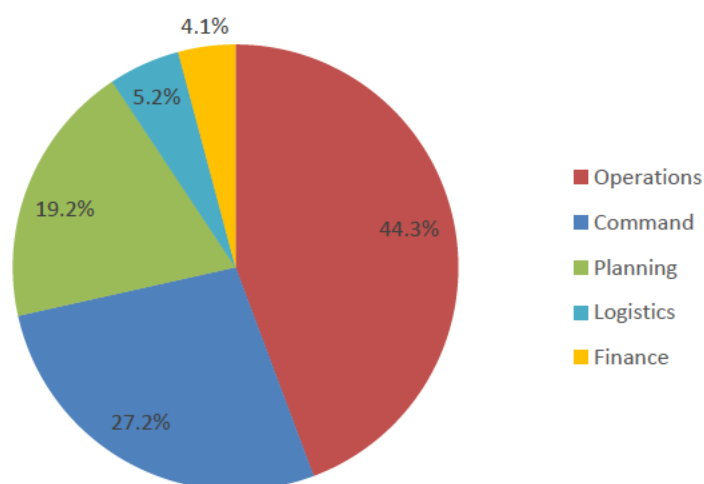
Exhibit 9. Number of Individuals Deployed for the California Wildfires by Region/Office

Home Region	Number of Individuals
HQ	12
1	2
2	-
3	1
4	-
5	1
6	23
7	27
8	30
9	92
10	22
Total	210

Source: 2017 ER Resources Qlik Application

The 210 staff completed 386 deployments. While most individuals only deployed once, 42 individuals were deployed twice, and 45 individuals were deployed 3 or more times. Exhibit 10 summarizes the roles served in the 386 deployments by ICS section.

Exhibit 10. Roles Served in Individual Deployments for Wildfires



Source: 2017 ER Resources Qlik Application

Analysis of Core Capabilities

The following sections provide an overview of the performance related to each core capability, highlighting strengths and areas for improvement.

Planning

This section presents an analysis of planning capabilities related to the California wildfire response, including personnel deployment, EU operations, SIT operations, and interagency communications.

Personnel Deployment

Responders in various roles reported that the deployment packages were helpful. Included in most deployment packages was information about accounting, lodging, equipment/gear, check-in/out procedures, People Plus charging information, and demobilization information. In addition, responders reported knowing who to report to upon mobilization and that they were provided adequate work assignment information during their deployments/activations.

Environmental Unit Operations

Environmental cleanup/monitoring plans were reviewed by the ENVL, and several responders involved in planning reported that the impacted region properly utilized the EU. The ENVL focused on data review during the asbestos-containing material (ACM) removal operations. ENVL personnel would review parcel data provided by the USACE and look for discrepancies for parcels requiring verification. Asbestos expertise from Region 8 and Region 9 helped clarify the interpretation of analytical results of asbestos fibers affected by high temperatures, which helped determine whether an ACM removal was necessary on certain parcels. The ENVL also performed quality assurance of all data entered into the geographic information system (GIS) Collector App, as well as sampling data.

ENVL personnel were deployed when there was no analytical data being produced in the field, which resulted in personnel not understanding their roles. There was a delay in understanding the need between managing data metrics in the field and evaluating environmental data (e.g., multi-media sample results and quality assurance/quality control).

Situation Unit Operations

SITL personnel were deployed to each branch due to the immediate and rapid need for reporting metrics. The Branch SITL coordinated with the ICP SITL to get accurate and timely information.

Some responders felt that SITLs in the field understood the information needs of the impacted ICP very well. However, others commented that the SITLs seemed overwhelmed early in the response and slow to understand the battle-rhythm reporting needs.

Performance Feedback

Several responders reported that they received consistent feedback on their performance throughout the response, most notably within Operations.

Planning Strengths and Areas for Improvement

Strengths

- Responders generally felt that deployment packages provided adequate information to prepare them for their deployments.
- The EU was properly utilized by the impacted region.

Public Information

This section presents an analysis of planning capabilities related to the California wildfire response, including the CCP/Communications Plan, outreach materials, translation/language needs, press coordination, and community engagement.

CCP/Communications Plan

Early on (prior to the JFO), Region 9 met with federal, state, and local PIOs. Coordination with local government officials was essential to the success of the response. Early engagement with local officials built trust and ensured that Region 9 was invited to meetings with enough notice to staff them. Additionally, public communications personnel reported that the PIO leadership cadre met with appropriate frequency. Staff also reported that CICs coordinated often with PIOs at the FEMA JFO. Twice daily briefs were held with PIOs and the State Operations Center (SOC), where EPA, FEMA, and state personnel were located. Responders reported conflicting information regarding whether or not the region had a communications plan or implemented a CCP. Most responders that were aware of the CCP believed that it was well-implemented.

Outreach Materials

Factsheets

CICs reported they always had fact sheets approved by the impacted region's PIO before they were printed and distributed. There were no printer capabilities in the Command Post for the first week of the response. This was compounded by GPO restrictions for printing significant numbers of copies, which led to delays distributing information in a timely manner and caused additional work.

Response.epa.gov

Communications and public affairs personnel reported that response.epa.gov worked very well as the public information web platform. The region created a mobile-based GeoViewer for internal and external use, which allowed people to have near-real time data from the field. A senior leader with OPA discussed that the response.epa.gov website worked more efficiently than creating a separate incident specific website.

Story Map

A story map was developed for the response, which tracked the survey, collection, and disposal of HHW materials at residential and commercial parcels affected by the fires. The story map was reported as being essential in building trust and support for the response work.

Community Engagement

In a disaster hot wash and RM discussion, public outreach during the wildfire response was highlighted as a success. The Agency conducted multiple community meetings and also posted “parcel complete” signs on properties, which established goodwill with residents. Furthermore, at an NIT meeting, staff noted that the after-hours attendance of EPA responders at these community meetings was one of the best practices of the response.

Public Information Strengths and Areas for Improvement

Strengths

- CICs coordinated with PIOs at the FEMA JFO often.
- Coordination with city and county officials was successful.
- Response.epa.gov worked well as the public information web platform.
- Public outreach was successful.

Logistics

This section presents an analysis of planning capabilities related to the California Wildfire response, including contracting, lodging, and staffing.

Contracting

Region 9 managers identified robust contracting resources as a strength. START and ERRS contracts were able to upscale quickly. The CO was instrumental in providing timely support to ensure quick ramp-up of the contractor to sustain the high level of support needed. The Region 9 Contracting Office and emergency response (ER) contract CO were cooperative in providing timely award of Task Orders, Purchase Orders, and Purchase Card purchases; and were responsive to all needs of the response by ensuring the technical work would not be delayed due to any administrative requirement.

Sections of Resource Ordering and Tracking (RSC, LSC, and PSC) were not on the same page with regards to Agency requirements on the 213 RR process. This indicated that better communication from IC and the RIC was needed regarding all sections of the 213 RR EPA process to ensure Agency requirements are met while still enabling Operations (OPS) to do their job, especially if management directs the LSC to deviate from the Incident Procurement Plan.

Lodging

Region 9 established a Logistics Travel Unit Leader to support regional staff with travel orders and reservations. This position was an asset to the logistics process. At an NIT meeting, the region’s lodging issues were discussed. Hotel space offered at the government per diem rate was difficult to find, but FEMA allowed 250% of per diem for the first few weeks of the response. Close coordination with the ESF-10 and regional Comptroller’s office (Travel Coordinator) ensured that the FEMA-specific requirements for travel per diem were provided to responders and support was provided to help them with obtaining lodging that met FEMA restrictions.

Policy memoranda were issued for authorization of actual expenses, blanket waivers for expenses greater than \$5,000, and waivers for lodging within the 50-mile radius.

Staffing

Region 9 managers reported that the response was a positive experience for non-field KLP personnel in terms of improving morale. Several responders also reported that the experience provided valuable training/learning opportunities. Management support resulted in staff ensuring timely work and cooperation, which was essential to the success of the response.

Region 9 recently lost several OSCs and now has 10 OSCs. Managers expressed that they need more than their historical allocation. During the wildfire response, the region had to utilize Remedial Program Managers (RPMs) for assistance.

Logistics Strengths and Areas for Improvement

Strengths

- Contracted resources responded quickly to requests and the CO provided timely and effective support.
- Region 9 established a Logistics Travel Unit Leader to support regional staff.
- The response was a good experience for non-field KLP personnel.

Areas for Improvement

- None noted.

Finance

This section presents an analysis of finance capabilities related to the California Wildfire response, including financial management, and time reporting and pay.

Financial Management

Finance/Administration Section Chiefs reported that they received excellent response and support from the Comptroller's office, and that daily sign-in/sign-out procedures were very effective for tracking the burn rate. Resource management and timely updates of personnel information helped the FSC maintain the requirement cost reports with real-time numbers.

The Finance Section in the ICP was staffed with well-qualified personnel who understood EPA's rules and regulations, and had access to the appropriate systems. This enabled the FSC to compile reports needed to effectively provide critical financial information to EPA management as well as FEMA. The ability for the Finance Section to schedule rotations of qualified staff ensured that Finance operations would be seamless. Newly trained FSCs were brought in to shadow experienced FSCs, after which the newly trained FSCs were allowed to do a full deployment later in the response.

Time Reporting and Pay

At the start of the response, Region 9 worked with the regional Comptroller and the HR office to draft language and process pay cap waivers for personnel. Human Resources, Superfund AO, and Regional

People Plus coordinator were instrumental in providing critical support in setting up appropriate accounts for personnel to charge time to, and to communicate and coordinate the pay cap waivers to HQ and help facilitate any information requests.

Region 9 managers reported that there were issues with pay caps and tracking of payroll, as People Plus was unable to reflect information in real time. Feedback was provided that it was also complicated to determine the base salary to charge FEMA for each deployed personnel. Furthermore, several responders did not believe that they were adequately briefed on timekeeping/charging procedures prior to deployment. Some responders were not briefed after their deployments, leading to challenges with receiving overtime pay. It was also difficult to address employee questions on when they would hit their pay cap. Responders experienced various issues with time reporting in People Plus. The updates to People Plus made it more difficult for staff to enter their time, and caused inefficiencies in processing information. Several responders also reported significant challenges with processing overtime in People Plus, and receiving their respective pay in a timely manner.

Finance Strengths and Areas for Improvement

Strengths

- Daily sign-in/out procedures for EPA responders were effective for tracking the burn rate.
- The Finance Section in the ICP was staffed with well-qualified personnel.
- The region drafted guidance on pay cap waivers for non-R9 personnel at the start of the response.

Areas for Improvement

- None noted specific to Region 9. See “Finance” section of report for discussion of recommendations related to financial management and time reporting and pay.

Health and Safety

This section presents an analysis of health and safety capabilities related to the California Wildfire response, including CISM, safety briefings, and PPE and safety supplies.

CISM

Many wildfire responders were aware of the CISM team and the services they offered, as well as how to contact them. There were frequent visits by the CISM team to the ICP and field branch locations, and few responders reported being unaware of the CISM team prior to deployment. In an interview, Region 9 managers discussed the challenges with high workload and high stress during the response. Staff were encouraged not to focus on the backlog of work and maintain a work/life balance. Region 9 managers recognized the need for executives to be cognizant of these challenges and encourage staff to ramp down from high-stress situations.

Safety Briefings

Daily safety briefings were held at all Command and General Staff meetings. Safety messages were communicated to and from the branch locations and ICP. HASP and general safety information was also looped in a standing presentation at the ICP’s media display and updated regularly.

All personnel assigned to the ICP were given an initial safety briefing and required to have read and signed the HASP. The Napa Branch ASO (from ERT) mandated HASP and general safety briefings for all new personnel via an iPad interactive program. ASOs maintained revised HASPs on the eparesponse.gov website. Field personnel were given safety briefings when they arrived at a branch location. On occasion, personnel did not receive an initial safety briefing due to the expedited need to get personnel to their field locations. Some Operations and PSCs, a Resources Unit leader, ASOs, and SITLs reported they did not receive initial site safety briefings. It was additionally expressed that an initial briefing would have been useful for new field staff since daily safety briefings highlighted new topics each day.

All accidents and near misses were reported by the ASOs to the Site Safety Officer (SSO) at the ICP immediately so that an analysis could be performed to prevent any future accidents. Preventative measures for illness were also put in place for all field locations and the ICP during cold/flu season.

PPE and Safety Supplies

Responding personnel generally reported having proper PPE that fit properly for the positions they served. However, some staff reported periodic shortages of safety vests, ear plugs, and hand wipes.

Health and Safety Strengths and Areas for Improvement

Strengths

- The CISM team visited the ICP and field branch locations frequently.
- ASOs maintained revised HASPs on response.gov.
- The HASP and general safety briefings were mandated for all new personnel.

Areas for Improvement

- For this response, not all staff received initial site safety briefings upon arrival to the field because they were not always processed through the ICP (many were deployed directly to the branch location).
 - **Recommendation:** All personnel deployed to the field should first be processed through the ICP to receive a safety briefing before mobilizing to their assigned area.
 - **Recommendation:** Deployment notices should include a general safety briefing, and indicate where staff are expected to receive a full safety briefing before mobilizing to their assigned areas.

Operations

This section presents an analysis of operations capabilities related to the California Wildfire response, including ICS implementation, ESF-10 coordination, REOC operations, field operations, interagency coordination and tasking, RSC operations, and infrastructure systems.

ICS Implementation

ICS Process

Most responders reported that the ICS process seemed to be well-followed. Region 9 felt that responders had a positive experience and that participating in the response boosted their morale. Additionally, RPMs who responded developed a better appreciation for the work OSCs do.

Training

Region 9 managers reported that there is concern that support positions (KLP positions traditionally by non-OSCs) are not as robust as they could be. There is a need to train people who already have experience in support positions. This could involve, for example, resourcing out Finance to OCFO and Data Management to the Office of Environmental Information. Furthermore, managers expressed that additional training to emphasize the ICS structure would benefit executives. This was not necessarily an issue specifically in Region 9 during this response, but thought to be generally beneficial to senior leaders.

Division/Group Supervisors reported that they did not feel that their training prepared them for their roles or responsibilities in the response.

Incident Management Team

Region 9 activated a full IMT from the beginning of the response. As the response progressed, the IMT transitioned to one operational period and one IAP per week, but continued meeting on a daily basis. The IMT and RIC continued their coordination efforts, and IMT daily reports and progress met expectations. The region finished the response ahead of schedule and under budget.

ESF-10 Coordination

During a RM's meeting, managers identified as a success the work of the ESF-10 representative who obtained a \$50 million MA for Region 9, which was sufficient for the region to conduct their mission without the need of amendments, unlike the hurricane responses.

Having a well-trained and established ESF-10 representative was essential for this response. Relationships were built in advance of disaster response, and familiarity with FEMA personnel and processes allowed for effective coordination in tasking of MAs.

It was reported that additional surge support from regional ESF-10 representatives was needed for this response.

REOC Operations

It was reported that routine calls between the REOC and HQ EOC occurred regularly at the start of the response. Calls were later held on as as-needed basis after weekly SitReps were issued. The establishment of a regular reporting rhythm allowed communications to transition effectively once the incident stabilized. Within the second week of the response, there was efficient and effective transfer of operations to the field ICP.

Once the REOC was stood up, full-time information technology (IT) support was required. Several REOC needs were also identified following the response, such as reorganization of the functional support rooms with added capabilities to share information electronically between the rooms.

Field Operations

Support by Regional Senior Management allowed Command Staff to effectively and independently manage the incident. Additionally, several Operations personnel reported that field decisions went through the proper chain of command all or most of the time.

Interagency Coordination/Tasking

Responders indicated that EPA coordinated well with the state. Biweekly meetings were held with EPA and the county, state, USACE, and FEMA at the ICP Branch level. The relationship between EPA Region 9 and FEMA was excellent. At the beginning of the response, EPA received an MA, which was adequate and did not require amendments to fund the response efforts.

Unified Command

Communication and close coordination with federal and state responders occurred at the State Operations Center and ICP. ESF-10 provided information and metric for field operations – both at the SOC and FEMA Branch level. Feedback from some responders indicated confusion as to whether or not EPA was in UC with other agencies. This may have been due to USACE not operating in ICS, which resulted in lack of operational coordination.

USACE

A major issue identified with Regional Managers was that of USACE's response readiness. USACE contractors were not asbestos-certified, and were unable to perform asbestos assessments and removals. As a result, FEMA tasked EPA with conducting the asbestos assessment and removal work, which added two months to EPA's response.

RSC Operations

Several response personnel reported that there is a need to develop a greater understanding of RSC roles and responsibilities, particularly with respect to interacting with contractors. In addition, a senior manager identified a need to rejuvenate the RSC cadre, as personnel numbers are low and recruitment is needed.

Infrastructure Systems

This section addresses the strengths and areas for improvement related to the infrastructure systems capability, including the water teams.

While a water team was not part of the MA, members were involved in the response and recovery efforts. One responder commented on the need for water teams to receive more national support and visibility from regional and national upper management.

Operations Strengths and Areas for Improvement

Strengths

- The ICS process was followed by staff and management.
- The ESF-10 representative was well-trained and experienced.

- Coordination with FEMA on MAs was strengthened by the relationship built with FEMA before the response.
- A regular reporting rhythm supported communication flow.
- Support by Regional Senior Management allowed Command staff to effectively and independently manage the incident.
- Field decisions went through the proper chain of command.
- The Agency coordinated well with the state.
- Asbestos expertise from Region 8 and Region 9 helped clarify the interpretation of analytical results of asbestos fibers affected by high temperatures.

Areas for Improvement

- Division/Group Supervisors did not feel that their training prepared them for their roles and responsibilities in the response.
 - **Recommendation:** The regions should provide relevant training and job aids for RSC personnel who fill these roles in a large response.
- Additional surge support in regional ESF-10 representatives was needed.
 - **Recommendation:** Additional surge support in regional ESF-10 representatives should be incorporated for long-term responses.
- USACE was not prepared to perform asbestos assessments and removals.
 - **Recommendation:** The Agency should coordinate with FEMA and USACE on contracting strategies. The agencies need to coordinate so that EPA and USACE have a clear understanding of their expected roles and responsibilities.
- Roles and responsibilities should have been more clearly established for RSC members.
 - **Recommendation:** Conduct additional training and job aids to define roles and responsibilities.
- The RSC cadre needed to be rejuvenated.
 - **Recommendation:** Actively recruit regional and potentially HQ employees with relevant experience for support KLP positions.

Data Management

This section presents an analysis of data management capabilities related to the California Wildfire response, including data collection, reporting, and management.

Data Collection

START was the lead for data input/management in Region 9. Several responders highlighted in their feedback the usefulness of the “Collector” app for capturing real-time field data. The app allowed the public to receive up-to-date information, which fostered trust and support for the Agency’s work.

Data Reporting

An LNO reported that details in press releases were always vetted by the subjects identified. PIOs and a Command Liaison vetted releases and checked with the SIT, the EU, OPS, etc.

Data Management

The DMP was supported by EPA intra-regional and contractor personnel.

Several responders involved in data management reported that EPA shared data well or very well with other Agency response partners. It was reported that there were many data sources and flows for this response. EPA used email, briefings, Flexviewer, and GIS Representation State Transfer (REST) services to share data with other agencies. There was no effective way to share large data files (> 25 MB) between federal agencies without using physical hard disk or USB drives.

Region 9 had a data support unit under Command, primarily Operations. One of the best practices of the response, identified at an NIT meeting, was having a designated Deputy IC who was in charge of data management. The Deputy IC posted a storyboard during the first week of the response, from which the community and news outlets obtained their information. This was successful for the region to maintain transparency during the response. Region 9 managers also reported that GIS overlays were available to document progress to the public. OSCs and CICs could use an iPad and pull up information about properties to update residents on the status of progress related to their property.

Data management coordinators reported that there is no training available for their specific role. They, as well as a PIO, expressed a need for more data management training, particularly emergency response data management training that is EPA-specific. Responders additionally reported that there were not sufficient Data Support Coordinators available to support the response. This data-heavy response highlighted the need for EPA staff development in data management. EPA also trained the state in data management so that they could exercise the same capability for the Southern California fires.

Data Management Strengths and Areas for Improvement

Strengths

- Designation of a Deputy IC who was in charge of data management contributed to the success of the response.
- Data quality objectives were well-anticipated.

Areas for Improvement

- There was a need for more data support coordinators.
 - **Recommendation:** The region should recruit and train more personnel to serve as data support coordinators and create a regional data team.
- There was no effective way to share large data files with other Agency partners.
 - **Recommendation:** The Agency should determine how large data packages can be shared effectively between federal partners.

Incident-Specific Strengths and Areas of Improvement

The following table summarizes the main strengths of the California Wildfire response.

Capability	Strengths
Planning	Responders were provided adequate information to prepare for deployments
	Responders received regular feedback
	The EU was properly utilized
Public Info	CICs coordinated with PIOs at the FEMA JFO often
	Public outreach was successful
Logistics	Contracting resources were timely and effective
	Region 9 established a Logistics Travel Unit Leader to support regional staff
	The response provided good experience for non-KLP field personnel
Finance	Daily sign-in/out procedures were effective for tracking the burn rate
	The Finance Section in the ICP was staffed with well-qualified personnel
	The region drafted guidance on pay cap waivers
Health and Safety	The CISM team visited the ICP and field branch locations frequently
	ASOs maintained revised HASPs on response.gov, and the HASP and general safety briefings were mandated for all new personnel
Operations	The ICS process was followed by staff and management
	Support by Regional Senior Management was effective
	A regular reporting rhythm allowed communications to transition
	The Agency coordinated well with the state
	The region had a good relationship with FEMA
	Field decisions went through the proper chain of command
Data Management	Designation of a Deputy IC for data management was effective
	Data quality objectives were well-anticipated

The following table summarizes the main areas for improvement of the California Wildfire response with associated recommendations.

Capability	Areas for Improvement and Recommendations
Logistics	All sections of Resource Ordering and Tracking were not on the same page about Agency requirements
	The region was low on the number of OSCs
Finance	The Agency should develop a tool to estimate when personnel are expected to reach their pay caps
Health and Safety	All personnel deployed to the field should first be processed through the ICP to receive a safety briefing before mobilizing to their assigned area
	Deployment notices should include a general safety briefing
Operations	The regions should provide relevant training and job aids for RSC personnel who fill these roles in a large response
	Additional surge support in regional ESF-10 representatives should be incorporated
	Actively recruit regional, and potentially HQ, employees with relevant experience to support KLP positions
	Coordinate with FEMA and USACE on contracting strategies
	Conduct additional training and job aids to define roles and responsibilities for the RSC
	Recruit and train more personnel to serve as data support coordinators

Data Management	Determine how large data packages can be shared effectively
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APPENDIX F: CONSOLIDATED LIST OF RECOMMENDATIONS BY CAPABILITY AREA

Capability Area	Area for Improvement	Recommendation
Areas for Improvement and Recommendations from All Responses		
Planning	Deployment and transition procedures/mechanisms were not sufficient to ensure that deployed staff were adequately prepared upon arrival or that duties were efficiently transitioned from one individual to the next.	The Agency should review and strengthen deployment and transition procedures. This could include standardizing the template for deployment packages, conducting pre-deployment briefings to provide situational awareness, developing procedures for documenting and communicating field operational decisions, preparing/maintaining position-specific guidance documents or conducting webinars on roles and responsibilities, or increasing the transition time for personnel.
	While response needs were generally met, the RSC program needs to be maintained or strengthened to ensure it has appropriate capability and depth to ensure appropriate staffing for similarly complex or concurrent events.	Conduct a needs assessment of the RSC program. The breadth and depth of the RSC cadre needs to be reviewed to ensure appropriate staffing for future response efforts. **
	While management reports were helpful during the response, EPA needs to continue to improve what is addressed in the report and how data, information, and metrics are displayed.	There should be a standard outline that all regions follow, with enough flexibility to adapt the report to different circumstances. **
Public Information	The time required to develop and for OPA to approve outreach materials (e.g., factsheets, story maps) delayed the prompt release of response information.	The Agency should develop factsheet templates, draft stock language, and prepare general factsheets on common issues related to disaster response to ensure that outreach materials may be developed/released more quickly in the future. **
Logistics	Options and procedures for securing appropriate lodging for response personnel need to be developed.	<ul style="list-style-type: none"> Develop a nationally consistent solution to how lodging needs can be met. As appropriate, coordinate with the OARM to work with COs on potentially utilizing room blocks as an option.

Capability Area	Area for Improvement	Recommendation
		<ul style="list-style-type: none"> Standardize PRL as the resource ordering tool. **
Finance	Timekeeping and pay policies, procedures, and processes need to be communicated and implemented in a timely, consistent manner. There was a lack of consistency in the pay cap waiver process.	Timely time reporting and charging guidance should be provided and fully implemented during responses. Regions should follow existing guidance on pay cap waivers and the pay cap waiver process.
Health and Safety	While most response personnel did not access CISM services, many indicated that speaking to someone would be helpful. CISM should have an increased presence in the field and responders need better access to CISM personnel.	Additional CISM-trained staff are needed to meet the needs of future responses. CISM operations should be included to ensure that response staff have a reliable way to access services as needed.
Operations	While many responders indicated their training prepared them well for the response, others indicated that additional ICS training would be beneficial, including for the water teams and the CEPD. In addition, additional ICS and Stafford Act training is needed for response personnel.	Additional ICS and Stafford Act training should be provided for response personnel, with an emphasis on training for KLP positions that lack adequate depth (i.e., SO/ASO, ENVL, SITL and LO) and senior executives. **
	Responders noted that regions had varying approaches to running IMTs, which could impact the effectiveness of backup region support.	An Agency-wide concept of operations should be developed for how to run an IMT.
	Tasking challenges arose between EPA and other federal agencies. For example, coordination needs to be improved between FEMA and EPA on the issuance of MAs and how EPA is tasked to provide drinking water and wastewater assistance. The Agency should also better coordinate with FEMA and USACE on contracting strategies, particularly related to asbestos assessments and removals. Tasking was also unclear between EPA and USCG, which requires a discussion at a national level and issues/decisions documented in writing during a response.	The Agency should coordinate with FEMA to clarify inconsistencies with MA issuance (i.e., coverage for REOCs and HQ EOC under the MA and issuance of multiple short-term amendments).
	There is limited knowledge and support of the ESF-13 mission within the Agency. ESF-13 missions were not fully integrated into	CID and other response personnel should be trained on the ESF-13 mission, the concept of operations, and

Capability Area	Area for Improvement	Recommendation
	ICS.	stakeholder roles. If CID continues to support ESF-13 operations, they should take ICS 300/400 training and receive more OJT familiarity with ICS structures and functions, and response plans should be considered.
	There is a need to coordinate with OW to identify data needs for drinking water and wastewater systems.	Select Agency personnel outside of CID should be trained on the ESF-13 mission, the concept of operations, and stakeholder roles.
	ESF-13 missions were not fully integrated into ICS.	Plans need to recognize that states may need to track different information while still allowing EPA access.
	While most EOC volunteers agreed that they had the data required to answer questions from leadership, coordination between the HQ EOC and the regions could be improved.	Explore ways in which coordination between the HQ EOC and the regions can be improved, such as through coordinating on data management.
Data Management	Incident-specific data collection and management protocols were not standardized and caused confusion among the regions, HQ, and other response partners.	Standard protocols for data collection and management should be developed and formalized. For example, regions should also coordinate with various response partners, including the HQ EOC, to understand data needs and responsibilities, standard queries should be developed, and data collection and management training should also be provided.**
Areas for Improvement and Recommendations from the Hurricane Harvey Response		
Planning	The mobilization and demobilization plans were slow to be finalized or not finalized, and the processes were unclear.	The demobilization and mobilization plans should be reviewed and simplified, and the Agency should develop updated templates for them.
	Some responders did not have a good understanding of their roles or responsibilities.	Provide additional training or webinars on various roles or responsibilities, such as data management/analysis, communications (e.g., public speaking, conflict management), leadership training, cultural training, stress management, and HHW collection/pad management.
Public Information	The process for releasing preliminary data to the public needed to be considered and documented.	Develop messaging templates to address communicating data to the public.

Capability Area	Area for Improvement	Recommendation
	CL roles and responsibilities were not clear or communicated soon enough, and CLs were deployed late in the response.	Coordinate with state and local agencies early in the response to identify their community outreach needs, and provide sufficient guidance to CLs on their roles and responsibilities through training/webinars, and conduct pre-deployment briefings.
	Environmental justice was not adequately integrated in the response.	The Agency should consider integrating environmental justice considerations into the CCP, such as through coordination with NGOs to maintain awareness of their concerns.
	There were challenges getting the fact sheets printed for public distribution.	Ensure deployed staff coordinate with regional staff who hold a GPO Express Purchase Card to pay for printing or similar costs.
	Translation services were needed throughout the response and they were not available in a timely manner for Hurricane Harvey.	Translation services and materials should be prepared and their availability ensured before a response, such as by having pre-approved translated materials on how to deal with common issues (e.g., mold).
	There was a need to better anticipate possible media inquiries on response activities.	Issue press releases to the public on response activities and accomplishments proactively.**
Logistics	Region 6 quickly used the available contract capacity for the Warehouse/Logistics contract, which required the use of a JOFOC.	The Agency should review the process for monitoring available contract capacity at the regional and HQ levels.
	Resource ordering did not follow the ICS process.	Consider process improvements such as staging areas where resources can be initially sent, ICS and Stafford Act training for senior leaders, and ensuring that the Logistics Section is in charge of resource ordering with appropriate input from Operations/Planning and senior management. In addition, the Agency should train and recruit more RSC for Logistics. **
Finance	More personnel support was needed for finance.	All IMH Finance positions should be filled and personnel with prior Finance work experience should be recruited to

Capability Area	Area for Improvement	Recommendation
		take FSC KLP training. In addition, all Finance staff should receive Stafford Act training.**
	An effective sign-in/sign-out procedure was not developed and implemented throughout the response.	The NIMS Integration team should develop an electronic platform that regions can utilize for sign-in/out during large responses, perhaps through WebEOC.
Operations	Communication from regional senior leaders, the REOC, and the field was inconsistent. This led to the N-IMAT being deployed prematurely.	Regional senior leaders need to coordinate with the REOC and determine the actual needs before requesting assets or requesting additional support from other regions. The Regional IC should be involved in the decision on when to mobilize the N-IMAT.
	Regional water program and the remedial program worked in parallel to the response.	<ul style="list-style-type: none"> • Provide ICS training for the Water Team and remedial programs, and include the Water Team in annual IMT exercises.** • The remedial program needs to develop a disaster preparedness plan for NPL site assessments.
	Tasking was unclear between EPA and USCG.	<ul style="list-style-type: none"> • The issue of authority should be addressed at a national level. • Issues/decisions should be documented during the response and all agreements should be in writing.
Data Management	Methods were inadequate and misleading for tracking boil water notices.	<ul style="list-style-type: none"> • The Agency should develop a more effective process for developing and tracking boil water notices. • A new protocol should be established for tracking the status of assessments.
	Conflicting information was communicated from different sources within the Agency.	ENVL and PIOs need to coordinate to improve messaging regarding data.**
Areas for Improvement and Recommendations from the Hurricane Irma and Hurricane Maria Responses		

Capability Area	Area for Improvement	Recommendation
Public Information	Personnel language skills and cultural background were not always taken into consideration when assigning deployments.	Regions should review skill sets identified in PRL.
Logistics	Options and procedures for securing appropriate lodging for response personnel needed to be developed.	Develop a nationally consistent solution to how lodging needs can be met. As appropriate, coordinate with OARM to work with COs on considering room blocking as an option.
	Region 2 quickly used the available contract capacity for both ERRS and START contracts, and struggled to place additional funding on the contracts.	The Agency should review the process for monitoring available contract capacity at the regional and HQ levels.
Finance	Regions did not have access to People Plus users outside of the host regions.	Coordinate with OCFO to provide the regions access to other People Plus users outside of the host region.
	Purchase cards in Region 2 were limited by spending cap and to certain personnel.	Logistics personnel in the field need to have access to a purchase card. Additionally, OSCs assisting the response from other regions should be allowed to use their purchase cards.
Operations	Roles and responsibilities between the region and CEPD were not clearly delineated.	Roles and responsibilities for CEPD staff should be clearly defined for future responses.
	There was a need to officially activate the SSC role.	The SSC role should be officially activated during a large response and be filled by an individual who is local and can serve in the position throughout the response.
	Better coordination regarding NCERT logistics was needed when participating in IC.	Supervisors should be ICS trained and represent OCEFT at the REOC.
	Coordination was not sufficient among FEMA, the states, and other federal agencies regarding MAs.	The Agency should coordinate with FEMA on expectations of HQ EOC and REOC support, on FEMA tasking of EPA to provide drinking and wastewater assistance, and on clarifying inconsistencies with MA issuance.
Data	Data collection methods needed to be improved in Region 2.	The region should hold training on data collection and

Capability Area	Area for Improvement	Recommendation
Management		DMPs, and HQ data needs should be anticipated during DMP development.**
Areas for Improvement and Recommendations from the California Wildfires Response		
Health and Safety	Not all staff received initial site safety briefings upon arrival to the field because they were not always processed through the ICP (many deployed directly to the branch location).	OEM should provide relevant training and job aids for RSC personnel who fill these roles in a large response.
Operations	Division/Group Supervisors did not feel that their training prepared them for their roles and responsibilities in the response.	The regions should provide relevant training and job aids for RSC personnel who fill these roles in a large response.
	Additional surge support in regional ESF-10 representatives was needed.	Additional surge support in regional ESF-10 representatives should be incorporated for long-term responses.
	USACE was not prepared to perform asbestos assessments and removals.	The Agency should coordinate with FEMA and USACE on contracting strategies. The agencies need to coordinate so that EPA and USACE have a clear understanding of their expected roles and responsibilities.
	Roles and responsibilities should have been more clearly established for RSC members.	Conduct additional training and job aids to define roles and responsibilities for the RSC.
	The RSC cadre needed to be rejuvenated.	Actively recruit regional and potentially HQ employees with relevant experience for support KLP positions.
Data Management	There was a need for more data support coordinators.	The region should recruit and train more data support coordinators and create a regional data team.
	There was no effective way to share large data files with other Agency partners.	The Agency should determine how large data packages can be shared effectively between federal partners.
** This recommendation is consistent with recommendations from the annual EPA Response Readiness Evaluation Program and/or is currently being addressed by the Agency.		